9150
Wireless Gateway

User Manual

August 24, 2002   **Part No. 80440.G**

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The Standard for
Wireless Fidelity.

ISO 9001 Certified
Quality Management System

PSION TEKLOGIX

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When requesting service, please provide information concerning the nature of the failure and the manner in which the equipment was used when the failure occurred. Type, model, and serial number should also be provided. Before returning any products to the factory, call the Customer Services Group for a Return Authorization number.

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Psion Teklogix provides a complete range of product support services to its customers. In North America, these services can be accessed through the Psion Teklogix Helpdesk. The Helpdesk coordinates repairs and training, helps you to troubleshoot problems over the phone and arranges for technicians or engineers to come to your site. For contact information and a listing of worldwide offices, please refer to Appendix A: "Support Services And Worldwide Offices".

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Every effort has been made to make this material complete, accurate, and up-to-date. Psion Teklogix Inc. reserves the right to make changes without notice and shall not be responsible for any damages, including but not limited to consequential damages, caused by reliance on the material presented, including but not limited to typographical errors.

Declaration Of Conformity

Product:	**9150 Wireless Gateway**
Application of Council Directives:	EMC Directive:89/336/EEC Low Voltage Directive:73/23/EEC

Conformity Declared to Standards:	EN 55022: 1994; Class B; ETS 300 328: 1996
	EN 50082-1:1997; ETS 300 683:1997; EN 55024:1998
	    EN 61000-4-2; ±4kV CD; ±8kV AD
	    EN 61000-4-3; 3V/m, 80-1000 MHz, 80% AM(1kHz)
	    EN 61000-4-4; ±1kV Signal lines; ±2kV Power lines
	    EN 61000-4-5; ±2kV Comm.; ±1kV Differ., ±1kV on I/O lines
	    EN 61000-4-6; $3V_{RMS}$, 150kHz-80MHz, 1kHz 80% AM
	    EN 61000-4-11; AC Mains Ports
	EN 60950: 1992 + A1 + A2 + A3 + A4 + A11

Manufacturer:	PSION TEKLOGIX INC. 2100 Meadowvale Blvd. Mississauga, Ontario; Canada L5N 7J9
Year of Manufacture:	1998
Manufacturer's Address in the European Community:	PSION TEKLOGIX S.A. La Duranne 135 Rue Rene Descartes BP 421000 13591 Aix-En-Provence Cedex 3; France
Type of Equipment:	Information Technology Equipment
Equipment Class:	Commercial and Light Industrial
Manufacturer:	Hector Perez Director of Engineering Psion Teklogix Inc. Ontario
Legal Representative in Europe:	Dominique Binckly Vice President International Sales Psion Teklogix S.A. France

Declaration Of Conformity

Product:	**9150DC Wireless Gateway**

Application of Council
Directives:

EMC Directive:89/336/EEC
Low Voltage Directive:73/23/EEC

Conformity Declared
to Standards:

EN 55022: 1998; Class B
EN 55024: 1998
    EN 61000-4-2; ±4kV CD; ±8kV AD
    EN 61000-4-3; 3V/m, 80-1000 MHz, 80% AM (1kHz)
    EN 61000-4-4; 0.5kV on DC lines; 0.5kV on I/O
    EN 61000-4-5; ±0.5kV on DC lines; ±1kV on I/O lines
    EN 61000-4-6; 3Vrms, 0.15-80 MHz; 1kHz 80% AM

Manufacturer:

PSION TEKLOGIX INC.
2100 Meadowvale Blvd.
Mississauga, Ontario; Canada L5N 7J9

Year of Manufacture: 2001

Manufacturer's Address in
the European Community: PSION TEKLOGIX S.A.
La Duranne
135 Rue Rene Descartes
BP 421000
13591 Aix-En-Provence
Cedex 3; France

Type of Equipment: Information Technology Equipment

Equipment Class: Commercial and Light Industrial

Manufacturer:

Hector Perez
Director of Engineering
Psion Teklogix Inc. Ontario

Legal Representative
in Europe:

Dominique Binckly
Vice President International Sales
Psion Teklogix S.A. France

Declaration Of Conformity

Product: **9100 PowerBaseT**

Application of Council
Directives: EMC Directive:89/336/EEC
                               Low Voltage Directive:73/23/EEC

Conformity Declared
to Standards: EN 55022: 1998; Class B
                               EN 55024: 1998
    EN 61000-4-2; ±4kV CD; ±8kV AD
    EN 61000-4-3; 3V/m, 80-1000 MHz, 80% AM (1kHz)
    EN 61000-4-4; 1kV on AC lines; 0.5kV on I/O
    EN 61000-4-5; ±2kV Com/±1kV Diff on AC; ±1kV on I/O
    EN 61000-4-6; 3Vrms, 0.15-80 MHz; 1kHz 80% AM
    EN 61000-4-11; Voltage dips and interruptions on AC
    EN 61000-3-2; Harmonic current emissions
    EN 61000-3-3; Voltage fluctuation and flicker on AC line

Manufacturer: PSION TEKLOGIX INC.
                               2100 Meadowvale Blvd.
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                               13591 Aix-En-Provence
                               Cedex 3; France

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Equipment Class: Commercial and Light Industrial

Manufacturer: Hector Perez
                               Director of Engineering
                               Psion Teklogix Inc. Ontario

Legal Representative
in Europe: Dominique Binckly
                               Vice President International Sales
                               Psion Teklogix S.A. France

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CAUTION TO USERS

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user is required to correct the interference at personal expense. The transmitters supplied are not to be operated within the frequency band 406 - 406.1 MHz.

RF EXPOSURE

Warning: ***To satisfy FCC RF exposure requirements for base station transmitting devices, a separation distance should be maintained between the antenna of this device and persons during device operation, as shown in the table below. To ensure compliance, operations at closer than this distance is not recommended.***

Antenna Type	Antenna Gain	Minimum Separation
1/2 Wave	2 dBi	20 cm
CONIFER	24 dBi	15 ft. (4.6 m) high and 10 ft. (3 m) away
Mobile Mark	12 dBi	15 ft. (4.6 m) high and 10 ft. (3 m) away

Changes or modifications not expressly approved by Psion Teklogix Inc. can void the user's authority to operate the equipment.

An unshielded plug or cable may cause radiation interference. All peripheral devices must be used with properly shielded interface cables and external filters as required. The shield must be connected directly to the chassis of the peripheral device.

 # IMPORTANT SAFETY INSTRUCTIONS

This safety information is for the protection of both operating and service personnel.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Operating Teklogix equipment where explosive gas is present may result in an explosion.

DO NOT REMOVE COVERS OR OPEN ENCLOSURES

To avoid injury, the equipment covers and enclosures should only be removed by qualified service personnel. Do not operate the equipment without the covers and enclosures properly installed.

DO NOT HOLD ANTENNA

To avoid discomfort due to the local heating effect of radio frequency energy, do not touch the antenna when a 9150 is transmitting.

CONNECTION TO OUTDOOR ANTENNA

Outdoor antenna to be earthed in accordance with International Standard EN 50083-1 (1993), "Cabled Distribution Systems for Television and Sound Signals - Safety Requirements".

ANSCHLUß AN ANTENNENNANLAGEN

Außenantennennanlagen müssen nach nationalen oder internationalen Normen (z.B. EN50083-1(1993) geerdet werden.

INTRODUCTION 1

1.1   About This Manual

This manual contains information about the installation, basic operation, and configuration of the 9150 Wireless Gateway.

Chapter 1: Introduction
> describes the 9150 and the radio protocols it supports.

Chapter 2: Installation Requirements
> describes the physical installation of the Teklogix 9150 Wireless Gateway and 9100 PowerBaseT, and how to connect to the 9150 for configuration/diagnostics.

Chapter 3: 9150 Main Configuration
> describes the web page options available from the main configuration menus.

Chapter 4: Access Point Configuration
> describes the configuration for a 9150 used as an access point device between wired and wireless networks.

Chapter 5: Base Station Configuration
> describes the configuration for a 9150 used as a base station or remote radio module (RRM) linked to a network controller.

Chapter 6: Mini-Controller Configuration
> describes the configuration for a 9150 used as a mini-controller.

Chapter 7: 9100 Monitoring/Diagnostics
> describes the fault monitoring, diagnostics and status reporting procedures for the 9100 PowerBaseT.

Chapter 8: Specifications
> outlines the performance specifications for the 9150T, 9150DC and 9100.

Appendix A: Support Services And Worldwide Offices
> presents information for technical support, contacts and the Psion Teklogix worldwide web address.

Appendix B: Port Pinouts And Cable Diagrams
> includes pinouts and diagrams of the ports and cables for the 9150.

Appendix C: MAC Bridge Protocol Filters and OUIs
> presents tables of values for Ethernet II and DSAP/SSAP types, and OUI.

1.2 Text Conventions

Note: *Notes highlight additional helpful information.*

Important: **These statements provide particularly important instructions or additional information that is critical to the operation of the computer and other equipment.**

Warning: **These statements provide important information that may prevent injury, damage to the equipment, or loss of data.**

1.3 About The 9150

The 9150 Wireless Gateway is designed to support a wide variety of system configurations. Using the IEEE 802.11b Wireless LAN Standard, the 9150 is capable of operating as a transparent bridge (access point) between wireless and wired networks. This allows wireless clients to access the network and also move seamlessly between the 9150s in the network. The 9150 can also operate as a Teklogix base station, remote radio module (RRM) or a mini-controller, and become part of a mapRF system.

Because the 9150 provides Ethernet connectivity, it can be added to an existing LAN. The 9150T provides the high-performance of 100Mb/s Fast Ethernet LANs, as well as 10Mb/s. The 9150DC edition incorporates most of the features of the high-performance 9150T, but is DC-powered, eliminating the need for AC wiring. For detailed information on LAN connectivity, please refer to page 21.

The 9150 supports Type II PCMCIA cards so that multiple radio interfaces are possible. The 9150 also has dual-radio functionality. It can support several combinations of radio types to function as both a mini-controller and base station, access point and base station, or access point and mini-controller. For details, see "Radio Options" on page 7.

The 9150 Flash memory holds the boot code, configuration parameters and firmware. The 9150 Configuration program allows various parameter settings to be changed, added or deleted. The Flash can be reconfigured remotely via the network using a standard HTML Web Browser such as Netscape or MS Internet Explorer (for instructions, see Chapter 3: "9150 Main Configuration").

Figure 1.1 The 9150 Wireless Gateway - Front View

Figure 1.2 The 9150T Wireless Gateway - Bottom View

Figure 1.3 The 9150DC Wireless Gateway - Bottom View

1.3.1 Access Point Functions

As an access point connected to a wired network, the 9150 Wireless Gateway forms a communication link between Teklogix RF terminals or wireless access point clients and a Teklogix Network Controller or a host computer. It communicates over an IEEE 802.11b RF data link with terminals, and over a cable with the network controller or a host computer. The 9150 can be connected to the network through an Ethernet connection. The diagram in Figure 4.1 on page 65 illustrates a 9150 access point connection between a Teklogix 9400 Network Controller on Ethernet and IEEE 802.11 wireless devices.

Two 9150 Wireless Gateways can be used as an 802.11b bridge connecting two separate wired networks. The 9150 can also be used as an 802.11b wireless access point to extend coverage area or for locations difficult to wire (see Figure 1.4 on page 10). For information on the 9150 as an access point, see "IEEE 802.11b Protocol" on page 8 and Chapter 4: "Access Point Configuration".

1.3.2 Base Station Functions

As a base station or Remote Radio Module (RRM) connected to a wired network, the 9150 provides a link between the local area network and the wireless network consisting of Teklogix mobile terminals, and wireless base stations such as the 9150 Wireless Gateway. The 9150 and 9400 Network Controller (or host using a Teklogix Software Development Kit) communicate using the 9010 proprietary protocol with TCP/IP over Ethernet connectivity. Wlan protocol enables the wired 9150 to communicate with 9150s without cable attachments (see Figure 5.1 on page 108).

For information on configuring the 9150 as a base station or RRM, see Chapter 5: "Base Station Configuration". For Wlan, see "Wlan Protocol" on page 13.

1.3.3 Mini-Controller Functions

The 9150 is equipped with some emulation capabilities, allowing it to act as a mini-controller. When a 9150 is configured as a mini-controller, Teklogix terminals can emulate an ANSI, 5250 or 3274 terminal through the 9150 rather than through a 9400 Network Controller.

To configure the 9150 as a mini-controller, see Chapter 6: "Mini-Controller Configuration". For a generalized system diagram, see Figure 6.1 on page 150.

1.4 Radio Options

The 9150 supports Type II PCMCIA cards so that multiple radio interfaces are possible. There is one internal and one external PC card slot available. The type of PCMCIA radio card installed in the 9150 is dependent on your wireless network. Currently supported radios are:

- TRX7370 Narrow Band DSP (available in either two level or four level modulation, with bit rates of 4800 b/s and 9600 b/s, or 9600 b/s and 19200 b/s, respectively).

- TekLAN 902 MHz DS Spread Spectrum (TRX7410).

- Lucent WaveLAN IEEE 802.11 DSSS 2.4 GHz (TRX7431 - up to 11Mb/s).

The 9150 can support several combinations of radio types, operating on different channels, to function as both a mini-controller and base station, access point and base station, or access point and mini-controller. The 902 MHz, 2.4 GHz (802.11 and TekLAN) and Narrow Band radios can be used in any combination, with the exception of dual TekLAN or dual Narrow Band radios.

Note: *The 9150DC supports dual 802.11 radios, but not Narrow Band or TekLAN 902 MHz radios. For details on the 9150DC, see page 22.*

Important: **The radio in the terminal must match the radio in the 9150 Wireless Gateway. If changing radio types in the 9150, DO NOT "hot swap" the PC cards: Turn the 9150 off before changing the radio.**

1.5 Radio Protocols

RF protocols allow terminals to communicate with a base station by sharing the use of a radio channel in an efficient way. Teklogix systems use one of three types of RF protocols: the Teklogix Adaptive Polling/Contention protocol, the Teklogix Wireless LAN (Wlan) protocol, or the non-proprietary IEEE 802.11b protocol. When used as a base station, the 9150 uses either the Adaptive Polling/Contention protocol or the Wlan protocol. These protocols *cannot* be mixed on a single system. When used as an access point device, the 9150 employs the IEEE 802.11b protocol. The protocols are described in the following sections.

1.5.1 IEEE 802.11b Protocol

The IEEE 802.11b protocol is an OSI standard for Wireless Local Area Networks (WLANs). With this standard, any IEEE 802.11b radio can communicate with any other similarly-equipped device. However, IEEE 802.11b does not provide a standard for a total WLAN system. IEEE 802.11b solely standardizes two communications layers: Physical (PHY) and Medium Access Control (MAC). Three different PHY layer media are covered: 2.4 GHz Direct Sequence Spread Spectrum radio, 2.4 GHz Frequency Hopping Spread Spectrum radio, and infrared. Each station in a WLAN system has its own unique MAC address.

> ⚠️ *Important:*   *Equipment using one physical medium (e.g. Frequency Hopping versus Direct Sequence) will not interoperate with equipment using a different physical medium.*

IEEE 802.11b uses 2.4 GHz radios of relatively low power. The range is limited to no more than a hundred feet or so, depending on the conditions, and is usually restricted to "line of sight" operation. Therefore, most wireless networks need more than one coverage area, with terminals moving between the areas. To integrate those areas, systems using IEEE 802.11b protocol for their wireless networks require an IEEE 802.11b-equipped *bridge* device (or *access point*), such as the 9150 Wireless Gateway.

Using bridging software, the 9150 Wireless Gateway enables communication between any wireless IEEE 802.11b-equipped stations and LAN stations operating on Ethernet. The 9150 itself is resident on the LAN and functions as a MAC bridge, providing transparent integration between the stations on the wireless and wired networks.

Each terminal is associated with one 9150. A frame from an RF terminal is sent to the 9150 that the terminal is associated with. The terminal puts a destination MAC address in the frame, which specifies a hardware address on the wired LAN side. Because the receiving 9150 is connected to an Ethernet network, it encapsulates the data in an Ethernet frame, including the destination MAC address specified by the terminal. The 9150 then sends the frame onto the physical network; the frame is picked up by whichever device is at the destination hardware address.

When sending frames from the LAN side, the sending device puts the MAC address of the terminal in the frame header. Whichever 9150 has that terminal associated with it, takes the frame and passes it over the RF to the terminal. By passing frames in this way, the 9150 is acting as a MAC bridge.

1.5.1.1   Inter-Access Point Protocol (IAPP)

The Inter-Access Point Protocol (IAPP) is an extension to the IEEE 802.11b protocol. IAPP facilitates roaming of mobile stations across different Basic Service Sets (see ***Note*** below) and specifies how access points communicate with each other.

> *Note:*   *A Basic Service Set (BSS) is a set of stations (terminals) controlled by a single coordination function, in this case by the 9150 Wireless Gateway functioning as an access point within the terminals' radio coverage area.*

In a multiple-9150 system, IAPP informs the other 9150 Wireless Gateways when a new 9150 becomes active, and enables the awareness of the 9150s of each other. With IAPP, an IEEE 802.11b system can operate on one or more channels, with terminals moving between the 9150s. Although each terminal is associated with one 9150, it can re-associate with another 9150 to maintain uninterrupted communications. The newly-associated 9150 will receive the terminal's data frames and pass them onto the LAN. Returning frames are no longer accepted by the original 9150, which has disassociated from that terminal. The returning frames are now accepted by the newly-associated 9150 and passed over the RF to the terminal.

1.5.1.2   Psion Teklogix' 802.IQ Protocol

802.IQ is a Psion Teklogix proprietary optimized protocol that enables terminals to operate on a wireless LAN in a network that supports both TCP/IP and 802.IQ protocol simultaneously. 802.IQ protocol is available in two versions: 802.IQv1 and 802.IQv2. The 9150 can support both versions of the protocol at the same time (terminals must use only one).

802.IQv1 protocol is a wireless LAN routing scheme that provides greater performance in an 802.11b wireless network than is possible with TCP/IP routing. The 9150 bridges the 802.IQv1 wireless and TCP/IP wired networks. A terminal can communicate with the 9150 access point using either TCP/IP or 802.IQv1 protocol, which makes possible a system with dual-operability.

802.IQv2 protocol is an enhanced version of the 802.IQv1 protocol that transports packets over the UDP layer. It provides all the 802.IQv1 functionality, with the added features of software upgrade capability over RF, the ability to add third-party access points between controllers and terminals, and integration into the MapRF system if desired.

For detailed information on configuring the 9150 as an 802.IQv1 access point, see "802.IQ Version 1 Configuration Menu" on page 68. For information on configuring the 9150 as an 802.IQv2 mini-controller, see "802.IQ V2 Features Menu" on page 201. Please see Figure 1.4 on page 10 for a generalized system diagram.
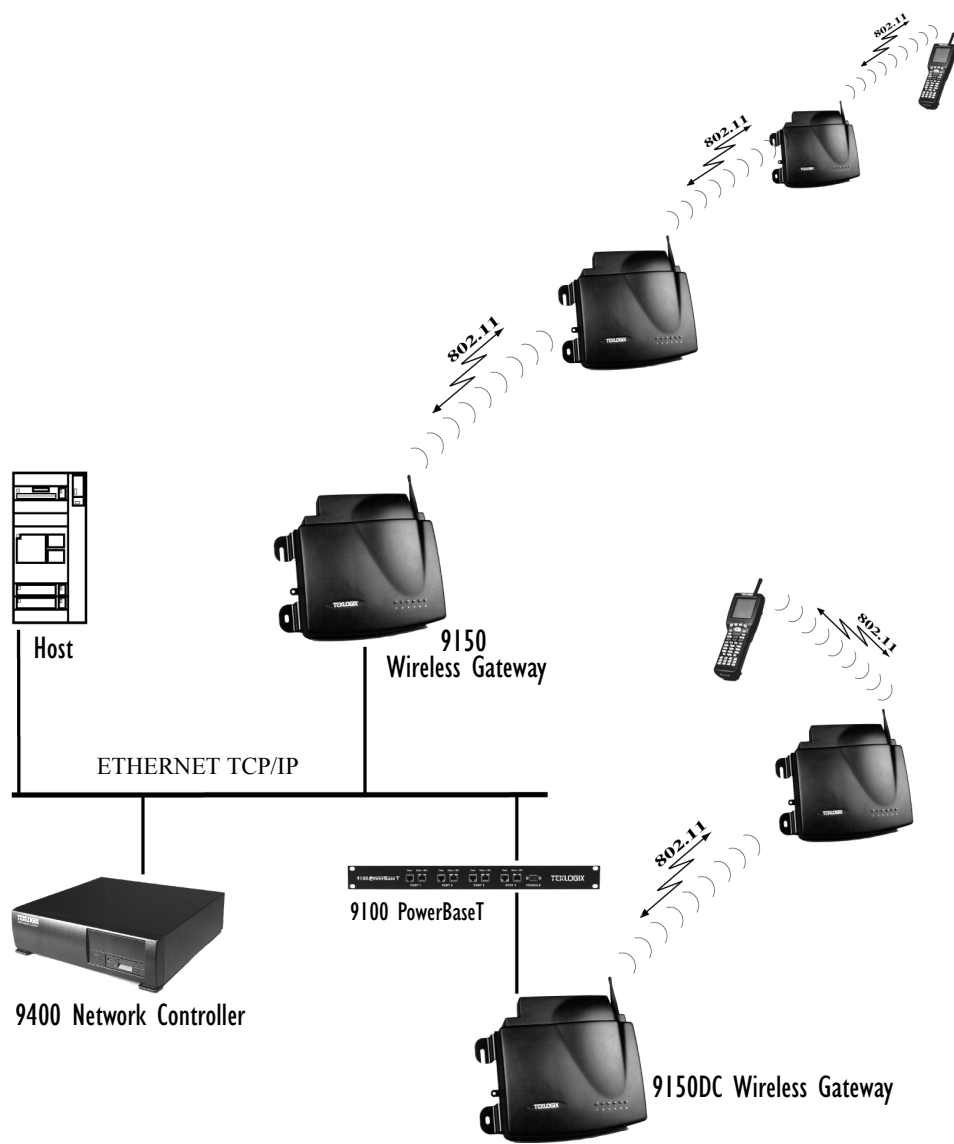
Figure 1.4 9150 Wireless Gateway: Wireless Access Point Configuration

1.5.1.3   802.1X Security

The 9150 can perform as part of an 802.1X system.

802.1X is an IEEE standard approved in June 2001 that enables authentication and key management for IEEE 802 local-area networks. Originally developed for wired networks, 802.1X defines the changes necessary to the operation of a MAC bridge in order to support port-based access control.

802.1X provides a means for MAC bridges, such as the 9150 in access point mode, to block packet traffic from individual ports until appropriate authentication for the port has occurred. For authentication, 802.1X defines a protocol that is used to encapsulate higher layer authentication exchanges for transport over IEEE 802 LANs.

The 802.1X standard defines:

- How MAC bridges perform port based access control

- A encapsulation protocol for higher layer authentication

- A method for delivering encryption key data from access point to station

802.1X does not define encryption methods or authentication methods.

Parts Of An 802.1X System

There are three parts to an 802.1X system:

Supplicant   Authenticator   Authentication Server
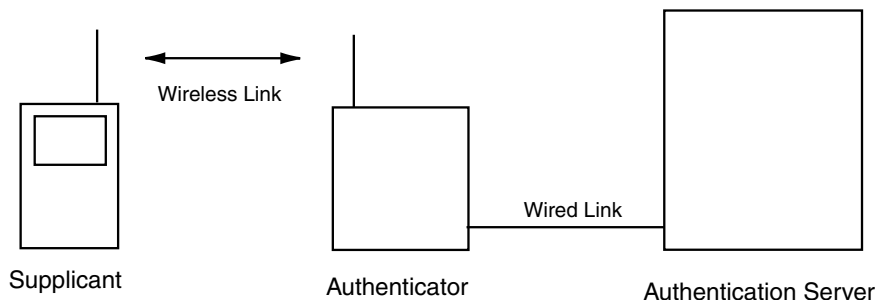
- Supplicant

    The "supplicant" is a network device that must be authenticated before its packet traffic will be forwarded to the wired network. The supplicant

connects to the authenticator, which communicates on its behalf to the authentication server.

The Psion Teklogix 7035, 8255, and 8260 terminals can act as supplicants.

- Authenticator

    The "authenticator" is a MAC bridge that blocks packets originating from supplicants from being bridged to the wired network until the supplicant has been successfully authenticated. The authenticator does not authenticate the supplicant but instead relays an authentication exchange between the supplicant and the authentication server using an appropriate transport protocol for each.

    The Psion Teklogix 9150 access point can act as an authenticator.

- Authentication Server

    The "authentication server" is responsible for authenticating the supplicant upon request from the authenticator.

Authentication in an 802.1X system is performed using the Extensible Authentication Protocol (EAP). Originally developed for PPP, EAP is a simple protocol that defines a basic authentication messaging exchange between two parties. EAP is extensible because it allows for support of different authentication methods.

The EAP messaging exchange takes place between the supplicant and the authentication server. The supplicant sends and receives EAP messages encapsulated in the EAPOL protocol, while the authentication server typically sends and receives EAP messages encapsulated in the RADIUS protocol. Between them, the authenticator accepts and repackages the EAP messages in the appropriate protocol for delivery to either the supplicant or the authentication server.

Although the authenticator does not actively participate in EAP messaging, it does passively monitor the EAP exchange between a supplicant and authentication server. When it receives indication that the supplicant has been successfully authenticated, the authenticator unblocks the bridge port for the supplicant, which is then accepted as part of the wireless network.

Psion Teklogix devices use the MD5-Challenge authentication method.

1.5.2   Adaptive Polling/Contention Protocol

The Adaptive Polling/Contention protocol is always used on Narrow Band radio systems with baud rates of up to 19.2 kb/s, and may also be used on Spread Spectrum systems at higher rates.

Terminals operating with this protocol do not transmit unless they receive polls from the 9150. Terminals are generally polled en masse. Following each poll, groups of terminals are assigned response windows in which they may respond to the poll. If a "collision" occurs – more than one terminal attempts to respond in a particular window – the 9150 that is polling divides and reassigns that group until the colliding terminals can respond without a collision.

Adaptive features of this protocol allow the response windows to be adjusted to accommodate high or low RF traffic conditions, and to prevent data from being queued too long when a particular terminal has a burst of data to send or receive.

Systems using adaptive polling/contention can use the cellular option so that terminal operators can roam the site, maintaining uninterrupted communication as they pass between coverage areas. If cellular base is not enabled, a "RESET: Press Enter" message appears on the terminal screen each time an operator moves from one base station coverage area to another.

1.5.3   Wlan Protocol

The Wlan (Wireless LAN) protocol is used only on Spread Spectrum radio systems at bit rates of 122kb/s and higher. The Wlan protocol allows base stations to be added to a system without cable connections. A Wlan system consists of a minimum of one wired base station and zero or more wireless base stations. It can operate on either one channel – usually the case – or on multiple channels.

When a Wlan system is operating, base stations do not send out polls. Instead, both wired and wireless base stations regularly broadcast routing information, indicating the available routes back to the controller. Both terminals and wireless base stations receive these broadcasts, determine the best communication route, and send their messages. If a better route becomes available, the terminal or wireless base will change communication paths.

Only one base station or terminal may transmit at one time. When the channel is clear, a combination of preset priorities and random choices determines who "goes next". Even if two transmitters attempt to send at the same time, message acknowledgements and retransmissions prevent any data from being lost.

Terminals moving through the Wlan communicate with the base stations that provide the best communication path to a wired base station. If multiple channels are used, the terminal looks for a better channel only if it cannot find an acceptable path back on its current channel.

For detailed information on configuring the 9150 as a base station, please see Chapter 5: "Base Station Configuration". For a generalized system diagram, see Figure 1.5.
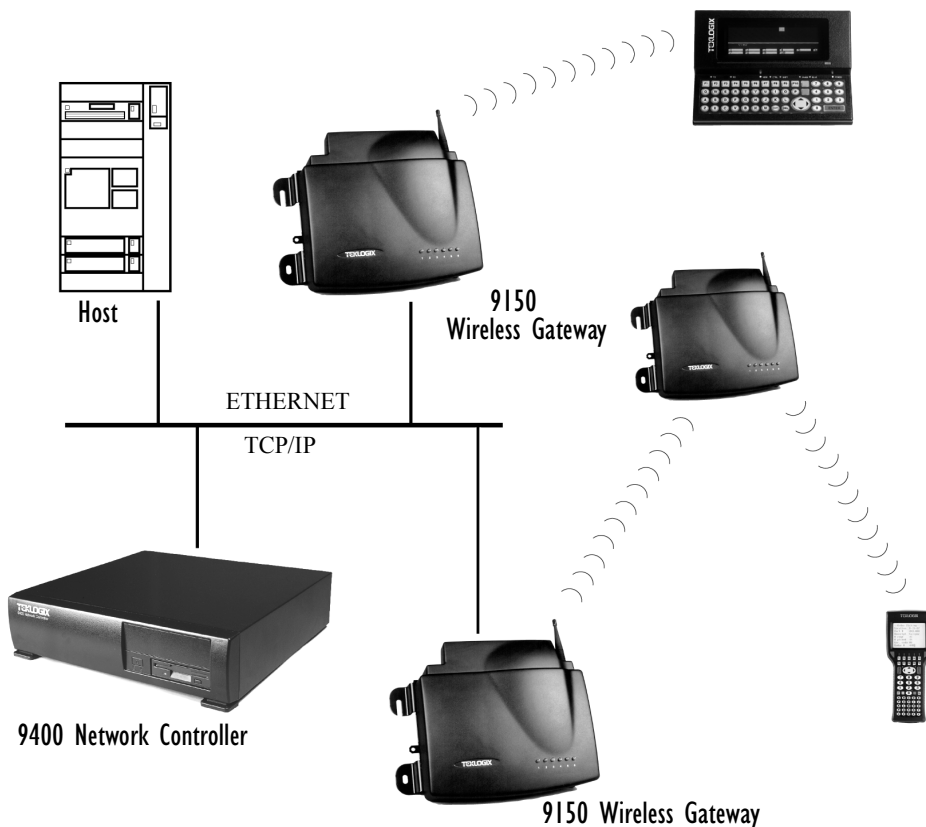

Figure 1.5 9150 Base Station/RRM Configuration

INSTALLATION REQUIREMENTS 2

> ⚠ ***Warning:*** ***The 9150 must be installed by qualified Psion Teklogix personnel.***

2.1 Choosing The Right Location

Typically, Psion Teklogix conducts a site survey in the plant and then recommends the preferred locations for the 9150s. These locations provide good radio coverage, minimize the distance to the host computer or network controller, and meet the environmental requirements.

2.1.1 Environment

2.1.1.1 9150 Wireless Gateway

The 9150 should be located in a well-ventilated area and should be protected from extreme temperature fluctuations (i.e. direct heater output, shipping doors or direct sunlight). If a protective cover is required, it must have enough ventilation to maintain the 9150's surface at or near room temperature.

Refer to Chapter 8: "Specifications" for a more detailed description of environmental requirements. Keep in mind that the long term stability of this equipment will be enhanced if the environmental conditions are less severe than those listed in this manual.

The 9150 should be situated away from the path of vehicles and free from water or dust spray. The 9150 should only be mounted in the upright position, as shown in Figure 2.1 on page 18. This orientation minimizes the risk of water entering the 9150, should the unit accidentally be sprayed.

The 9150 is attached to a vertical surface using four fasteners on the rear plate (type of fasteners are dependent on mounting surface). The top two holes in the rear plate are slots, allowing the unit to be hung in position before the remaining bolts are installed, thus easing installation. The bolts used for installation are SAE 1/4-20.
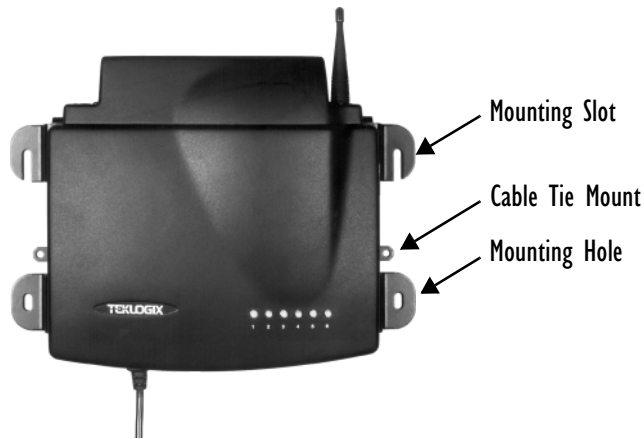
Figure 2.1 9150 Installation Position

2.1.1.2   9100 PowerBaseT

The 9100 PowerBaseT is a 19-inch rack-mounted device intended for installation in the same environment as your hub or switch. For detailed information on the 9100, please refer to page 24.

2.1.2   Maintenance

The 9150 has no internal option switches and does not require physical access; all configuration settings are done remotely (see Chapter 3: "9150 Main Configuration"). Environmental and radio communication considerations do still apply.

2.1.3 Power And Antenna Cables

2.1.3.1 Power

To prevent accidental disconnection and stress on the 9150, antenna and power cables should be secured within 30 cm of the unit. Secure the cables with ties to the cable tie mounts on the 9150 (see Figure 2.1 on page 18). A single phase power outlet (range 100 to 240 VAC rated 1.0A minimum) should be installed within one metre (3.1 feet) of the 9150. The 9150 automatically adjusts to input within that power range. The power cable is removable and is available in the power type specific to your location.

To eliminate the need for AC wiring, the 9150DC Wireless Gateway is powered over its Ethernet connection. For detailed information, please see page 22.

Warning: ***To avoid electric shock, the power cord protective grounding conductor must always be connected to ground.***

2.1.3.2 Antennas

The type of antenna required for each installation depends on the coverage requirements and the frequencies used. There are several omnidirectional antennas available from Psion Teklogix. Generally, a site survey determines the appropriate antenna. Psion Teklogix can also provide special, directional antennas. Consult Psion Teklogix service personnel for more information.

Warning: ***Equipment requires professional installation. The installer is responsible for ensuring that the 2.4 GHz antennas, 24dBi grid dish (P/N 21267) and 24dBi dish (P/N 21265), are used exclusively for fixed, point-to-point operation; and fixed, point-to-point operation excludes the use of point-to-multipoint system, omni-directional applications, and multiple co-located intentional radiators transmitting the same information. The maximum output power from the radio transmitter is 32 mW.***

Warning: **Never operate the 9150 without a suitable antenna or a dummy load.**

                              Connection to Outdoor Antenna: Outdoor antenna to be earthed in accordance with International Standard EN 50083-1 (1993), "Cabled Distribution Systems for Television and Sound Signals - Safety Requirements". The antenna must be installed by a qualified service person and installed according to local electrical installation codes. The antenna should be located such that it is always at least 15 ft (4.6 m) high and 10 ft (3 m) from the user and other people working in the area.

Warning: **For RF safety considerations, users are not allowed to approach close to the antenna.**

Psion Teklogix supplies the coaxial cable required to connect the 9150 to the antenna. When determining the location of the antenna, the coverage requirements of the antenna are considered in conjunction with the environmental requirements of the 9150.

The coaxial cable must be routed and secured using wire anchors and/or coaxial nail clips. A few extra inches of cable are required near the antenna and the 9150 to make disconnection easier.

2.2 Connecting To External Devices

This section contains general guidelines for connecting the 9150 to external
devices such as network controllers, base stations, host computers, PCs and video
display terminals.

2.2.1 Ports

Figure 2.2 below shows the locations of the port and power connectors on the base
of the 9150T [100BaseT Ethernet]; for the 9150DC, see Figure 2.3 on page 23). The
port pinouts are described in Appendix B: "Port Pinouts And Cable Diagrams".
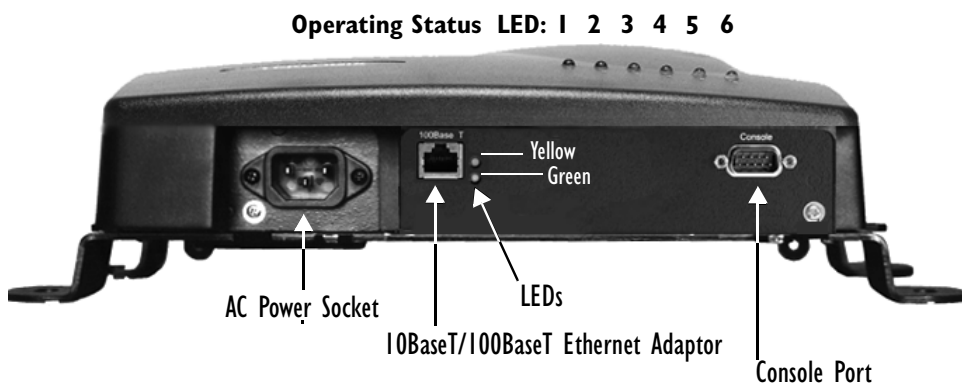
Figure 2.2 9150T Ethernet LED Locations*

*Note: The location of the LEDs is the same on the 9150DC (see Figure 2.3 on page 23).

2.2.2 LAN Installation: Overview

Because the 9150 provides Ethernet connectivity, it can be added to an existing LAN.
Generally, LAN installations are handled with the help of the network administrators,
as they are familiar with their network and its configuration.

Once the 9150 is installed, connected and powered on, the system administrator can
access the unit to check the configuration and to assign the 9150 its unique IP address.
This may be done through the Console port or through the network (see "Connecting

A Video Display Terminal" on page 28 and "Changing The Configuration With A Web Browser" on page 28). Subsequent changes in the network, such as the addition of stations or users, would also require that the 9150 configuration be changed.

Important: ***Once the 9150 is configured and rebooted the first time, the DHCP or Bootp option should be disabled—unless the 9150 obtains its IP address from a server, or the system administrator intends to update the software through bootp. For detailed information, see "Network Interface Configuration Protocol" on page 54.***

2.2.3 LAN Installation: Ethernet

2.2.3.1   9150T Wireless Gateway

The 9150T is a high-performance controller that supports 100Mb/s Fast Ethernet LANs, as well as 10Mb/s, with both full and half duplex operation.
It comes equipped with:

- 10BaseT/100BaseT card (using a category-5 twisted pair cable, an RJ-45 connector, running at a rate of 10 or 100Mb/s).

Note: *The 9150T does not support any connection type other than Ethernet 10BaseT and 100BaseT.*

See Figure 2.2 on page 21 for the connector locations. Since these ports are auto-selecting, jumper or configuration settings are not required. The maximum packet size supported over the network is **1500 bytes**. This parameter is not set at the 9150, but should be set at the host. For a description of port pinouts, please refer to Appendix B: "Port Pinouts And Cable Diagrams".

2.2.3.2   9150DC Wireless Gateway

The 9150DC incorporates most of the features of the 9150T. However, while the 9150T is AC-powered, the 9150DC Wireless Gateway is DC-powered, eliminating the need for AC wiring. The 9150DC is powered through a Category 5 ethernet cable that carries power and data signals simultaneously.

The 9150DC is connected to the 9100 PowerBaseT, a remote power module that inserts 48VDC power on the spare conductors of the ethernet cable to the 9150DC (for detailed information on the 9100, see page 24; for a system diagram, see

Figure 2.5 on page 25). Inside the 9150DC, a DC/DC converter is used to step down the +48 V provided by the 9100 to the +5 V required to power the main components of the gateway.

The 9150DC may also be powered via the Auxiliary Supply (48 V DC) power jack, which is adjacent to the ethernet RJ-45 connector (see Figure 2.3). For a description of RJ-45 port pinouts, refer to Appendix B: "Port Pinouts And Cable Diagrams".
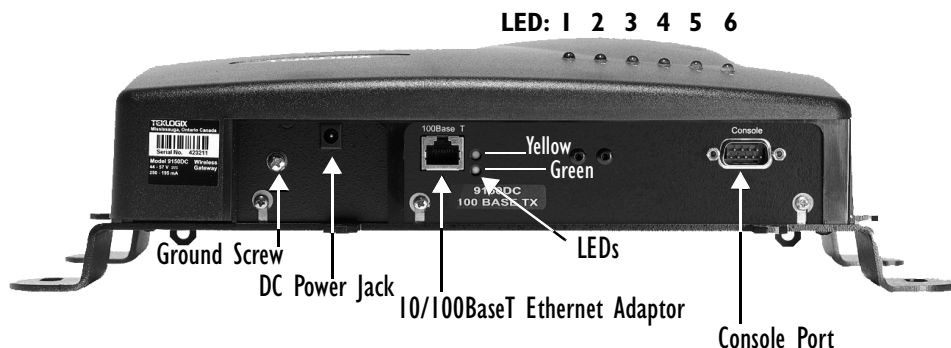
Figure 2.3 The 9150DC Wireless Gateway

Notes: *The 9150DC does not support any connection type other than Ethernet 10BaseT and 100BaseT.*

The 9150DC supports dual 802.11 radios, but does not support Narrow Band or TekLAN 902 MHz radios.

2.2.3.3 Ethernet Cabling

The maximum cable segment length allowed between repeaters for both the 9150T and 9150DC (10BaseT/100BaseT Ethernet cabling) is 100 m.

Note: *For the 9150DC (see "Important" note on page 24), this cable length is measured from hub to 9150, including the mid-span insertion of the 9100 PowerBaseT.*

Important: ***For Main Logic Board (MLB) P/N 30183-301 Rev F only: When connecting the RJ-45 Ethernet cable to the 9150T (AC power version), ensure that the snap-on ferrite for cables (P/N 97776) is placed on the cable as closely as possible to the RJ-45 jack. To determine which version of the MLB is resident in your 9150, please contact Psion Teklogix Support Services (see page A-1).***

2.2.3.4   9100 PowerBaseT Mid-Span Power Supply

Overview

The 9100 PowerBaseT module is designed to provide power over Ethernet and may be referred to as a "mid-span power supply" in that it intercepts the Ethernet cables between a hub/switch and the DC-powered 9150DC, as illustrated in Figure 2.5 on page 25. The 9100 has an internal, universal AC/48VDC power supply and routes DC power to each of its independent Data + 48V output Ports, following successful detection of a suitable powered device (a 9150DC). The Resistor Detection method is employed for this purpose, following application of power to the 9100, or connection of a powered device to a powered-on Port. The 9100 determines whether each connected device needs to be powered or not by determining if there is a signature resistor in the powered device between the 4/5 and 7/8 "spare" wire pairs. Subsequent disconnection of such a device is also detected. There are four identical, independent resistor/transistor networks, one for each output port. 48VDC is supplied via the unused pairs of a standard Ethernet Category 5 cable, while the Ethernet data lines (4 of the 8 conductors in the cable) are passed through the 9100 to the 9150DC. The 9150DC can accept power via either the unused pairs, or via the data pairs of a 10/100BaseT system connected to a suitable Power Over Ethernet switch/hub.

⚠️ *Important: **The 9100 does not contain any transceivers (the data signals are passed through) and is therefore subject to the 100 m cable length limitation (including the cable from the hub/switch to the 9100 PowerBaseT and any subsequent length added to the 9150DC).***

The 9100 PowerBaseT provides power for up to four 9150DCs (13 Watts per channel maximum), connected by twisted pair cables up to 100 m in length. See page 216 for power specifications.
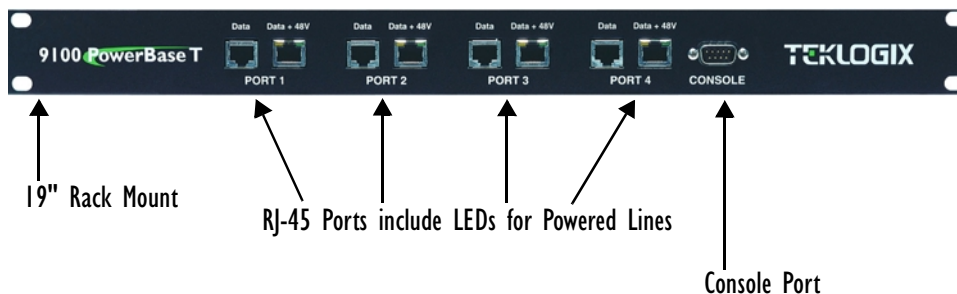

19" Rack Mount

RJ-45 Ports include LEDs for Powered Lines
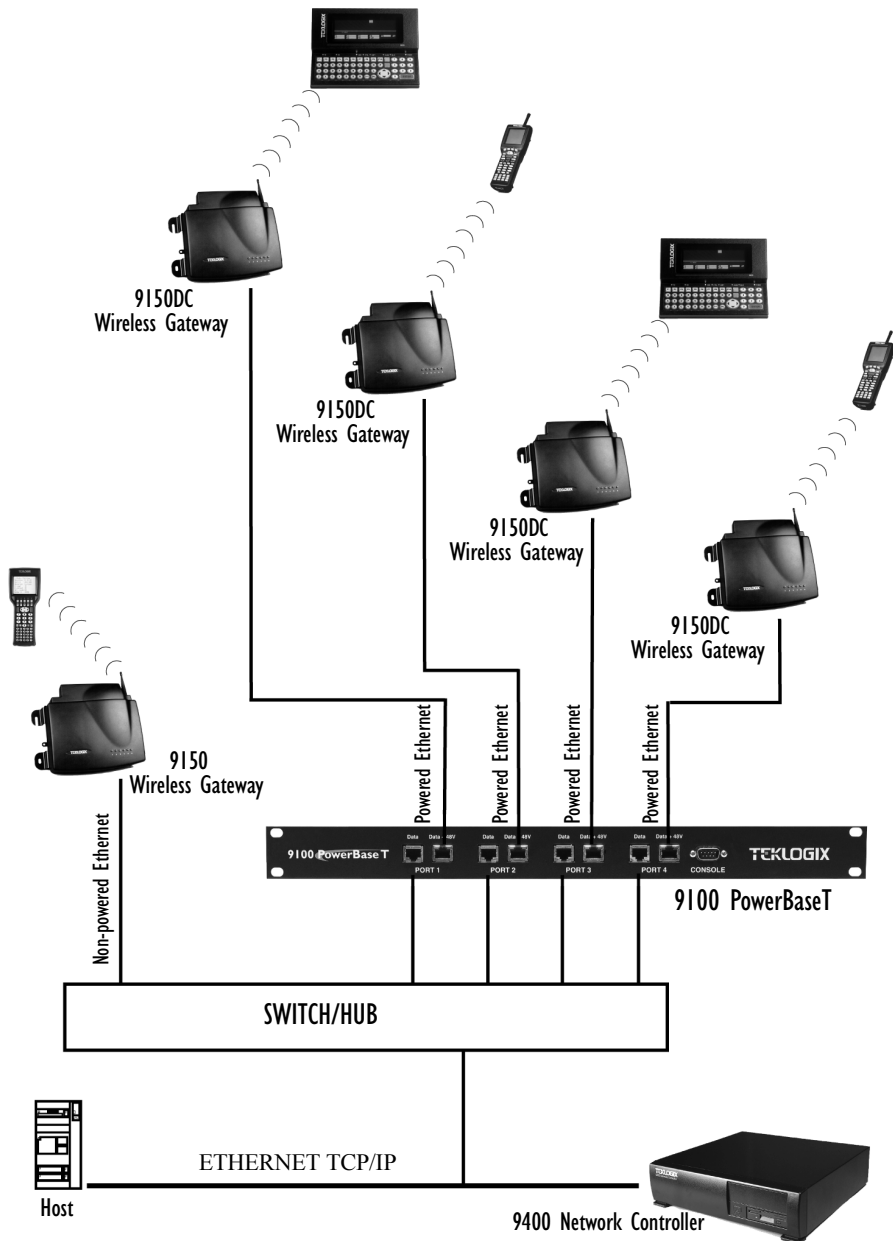
Console Port

Figure 2.4 The 9100 PowerBaseT

Figure 2.5 9100 PowerBaseT System Architecture

Functions

The 9100 PowerBaseT delivers 13 Watts per port for a total of 52 Watts. Power supplied to each of the four Ethernet ports is protected from over-voltage and current limiting within the power supply by the 9100's microcontroller. Its primary functions are:

1. Resistor Detection (described in Overview on page 24).
2. Fault Monitoring (page 207).
3. Power Monitoring (page 208).
4. Diagnostics and Status Reporting (page 208).

Status Indicators

The LEDs present at each port on the front panel of the 9100 (Figure 2.4 on page 24) indicate the status of the 9100 and the individual ports, as determined by the microcontroller. Table 2.1 below shows the LED state meanings.

Note: *Once a fault/abnormal condition is detected, the LED indicators will continue to blink until the condition has been corrected, with or without manual intervention.*

Status	Notes	Yellow LED	Green LED
Normal	Device present and powered	On	On
Normal / Fault	Device not connected / not detected	Off	On
Fault	Undercurrent fault (device disconnected)	Slow blink	On
Fault	Overcurrent fault	Fast blink	On
Fault	9100 main power supply fault	Fast blink (all ports)	Fast blink (all ports)
Test Mode	Port in test mode (enabled via console)	Fast blink	Fast blink
Test Mode	Port disabled (via console)	Off	Slow blink

Table 2.1 LED Indicator States

2.2.4 Status Indicators (LEDs)

2.2.4.1   9150T and 9150DC

The high-performance 9150T (see page 22 for details) and DC-powered 9150DC (see page 22 for details) both have six status indicators on the front of the enclosure, and an additional two status indicators on the base of the enclosure next to the RJ-45 connector port, as shown in Figure 2.2 on page 21. The numbered and coloured LEDs on the front of the unit indicate the operating status for each port, as described in Table 2.2. The coloured LEDs beside the RJ-45 port indicate the operating status of the resident 10BaseT/100BaseT card, as described in Table 2.3 on page 28.

LED Number	Name	Function	Colour
1	Ethernet link	Link indicator for 10BaseT/100BaseT: ON = good link; OFF = no link	yellow
2	Ethernet activity	Ethernet LAN activity (Rx/Tx)	green
3	PC Card A status[1]	PC Card A activity (Rx/Tx)	yellow
4	PC Card B status[1]	PC Card B activity (Rx/Tx)	green
5	SLIM[2]	SLIM card activity	yellow
6	Power	LED flashing = BIST[3] running/error detected LED On solid = BIST[3] Passed LED Off = no power to unit	green

[1]*When a TekLAN 902 MHz radio is installed, the PC Card status LEDs blink only when data is received from or transmitted to a terminal. When a TRX7370 narrow band radio is installed, these LEDs blink for all received and transmitted data traffic. (Note: the 9150DC only supports 802.11 radios.)*

[2]*LED #5 shows no activity, since the 9150T and 9150DC do not support serial connectivity.*

[3]*Built-in Self-Test.*

Table 2.2 9150T And 9150DC LED Functions: Front Enclosure

LED Colour	Status	Function
Green	ON	100BaseT speed selected
Green	OFF	10BaseT speed selected
Yellow	ON	Full duplex operation selected. (10BaseT or 100BaseT)
Yellow	OFF	Half duplex operation selected. (10BaseT or 100BaseT)

Table 2.3 9150T And 9150DC Ethernet LED Functions: Base Of Enclosure

2.2.5 Connecting A Video Display Terminal

An ANSI compatible video display terminal (e.g., DEC VT220 or higher), or a PC running terminal emulation, is used for diagnostic purposes and to configure the 9150's IP address for the first time (necessary before the 9150 can be accessed using a Web Browser; see "Configuring The IP Address" on page 31).

The terminal is connected to the port labelled "Console" on the 9150 (see Figure 2.2 on page 21). This port is normally set to operate at 19,200 b/s, with 8 bits, 1 stop bit, and no parity. To comply with Part 15 of the FCC rules for a Class B computing device, only the cable supplied (Part no. 19387) should be used.

2.3 Changing The Configuration With A Web Browser

The 9150 Flash memory can be reconfigured remotely via the network using a standard HTML Web Browser such as Netscape Navigator (version 4.05 or later) or MS Internet Explorer (version 4.0 or later). See Chapter 3: "9150 Main Configuration" for instructions on changing the parameters and general configuration settings.

For configuration information on setting up the 9150 as an *access point device*, refer to Chapter 4: "Access Point Configuration".

For configuration information on setting up the 9150 as a *base station*, refer to Chapter 5: "Base Station Configuration".

For configuration information on setting up the 9150 as a *mini-controller*, refer to Chapter 6: "Mini-Controller Configuration".

9150 MAIN CONFIGURATION   3

3.1 Configuration Main Menu

The 9150's flash memory can be reconfigured remotely via the network using a standard HTML web browser such as Netscape Navigator (version 4.05 or later) or MS Internet Explorer (version 4.0 or later).

Note: *To ensure that the 9150 configuration screens appear properly when using Netscape Navigator, in your browser go to Edit/Preferences/ Appearance/Colors. Make sure that the box for "Always use my colors, overriding document" is **NOT** checked.*

The 9150 Configuration program allows various configuration parameter settings to be changed, added or deleted.

Important: *The 9150 must be warm-rebooted after parameter changes are made, including configuring the IP address (see below), in order for the changes to take effect. For details, see "Reboot Unit" on page 62.*

3.2 Configuring The IP Address

Before the configuration menus can be accessed using your web browser, the 9150 must be assigned an IP address using a PC console connection. Virtually any PC can be connected to the console port of the 9150, provided that the PC has a serial port and a terminal communication program such as the Windows® HyperTerminal® utility or Procomm® Plus for Windows. These programs emulate an ANSI terminal such as VT220 or higher. Cable no. 19387 should be used to connect the PC to the 9150. Make sure the communications settings on your PC are set to 8 bits, 1 stop, no parity, and that the bit rate of the serial port matches that of the 9150 console port (19,200 b/s).

After the PC is attached and turned on, press the <RETURN> key several times until the ">" prompt appears. The commands used to configure IP addresses are described here. For the command to flash upgrade the 9150 software using TFTP, please refer to page 55.

If your system uses a DHCP or BOOTP server to assign IP addresses, make sure that the appropriate option is **enabled** (see "Network Interface Configuration Protocol" on page 54). Once enabled, and the 9150 is rebooted, you will be able to access the 9150 configuration menus through the Web Browser, using the IP address

identified in the server's address table. If you do not use a server, make sure that the DHCP or BOOTP option is **disabled** and continue with the configuration commands to manually assign an IP address.

Important: ***When your configuration is completed, the changes should be saved to flash by entering the following command (commands are case-sensitive):***

```
>cfg commitcache
```

To display the bootp setting:

```
>cfg get system.dobootp
```

To enable bootp:

```
>cfg put system.dobootp 1
```

To disable bootp:

```
>cfg put system.dobootp 0
```

To display the default IP address:

```
>cfg get interface.1.defaultipaddress
```

To configure the default IP address (xxx.xxx.xxx.xxx represents the IP address):

```
>cfg put interface.1.defaultipaddress xxx.xxx.xxx.xxx
```

To display the default gateway:

```
>cfg get system.defaultgateway
```

To configure the default gateway:

```
>cfg put system.defaultgateway xxx.xxx.xxx.xxx
```

To display the default subnetmask:

```
>cfg get interface.1.defaultsubnetmask
```

To configure the default subnetmask:

```
>cfg put interface.1.defaultsubnetmask xxx.xxx.xxx.xxx
```

3.3 Accessing The Menus

When the web browser is pointed to the 9150's IP address, a name and password dialog box appears. The password is comprised of alphanumeric characters and is case-sensitive. If you change the password (see "Users" on page 41), set all 9150s to the same password, and write it down in a secure place.

A default user name "user" and the password "123456" are created on 9150 system startup *if no users are already configured*. You can use the default to enter the Configuration Main Menu for the first time. For security, change this default name and password immediately after entering the configuration menus. Should you accidentally delete your user names, re-booting the 9150 will re-create the default name and password so that you can get back in to the unit.

After the 9150 accepts the password, it displays the Configuration Main Menu. The 9150 software automatically detects the system information of the unit, and most of the parameters have already been properly configured for each site.

> *Warning: **Parameters should not be altered without a clear understanding of how they operate. Parameters that are incorrectly set can increase response time or cause communication difficulties.***

- To highlight and move through the different options, use the <TAB> key or mouse pointer.
- To view and select the items in the listboxes, either press the <UP> or <DOWN> arrow keys or click on the arrow at the side of the menu and highlight the item.
- To enter the related configuration sub-menu dialog box, highlight "Configure" and either press <ENTER> or click on the "Configure" button.
- Where string entry parameters are given in the menus, changes are keyed in. Numerical parameters can be entered as hexadecimal values. Precede hexadecimal values with "0x".
- To leave a menu page, select either the <OK> or <Cancel> button at the bottom of the page. Selecting <OK> will save your changes and exit the page, while selecting <Cancel> will exit the page without saving the changes.

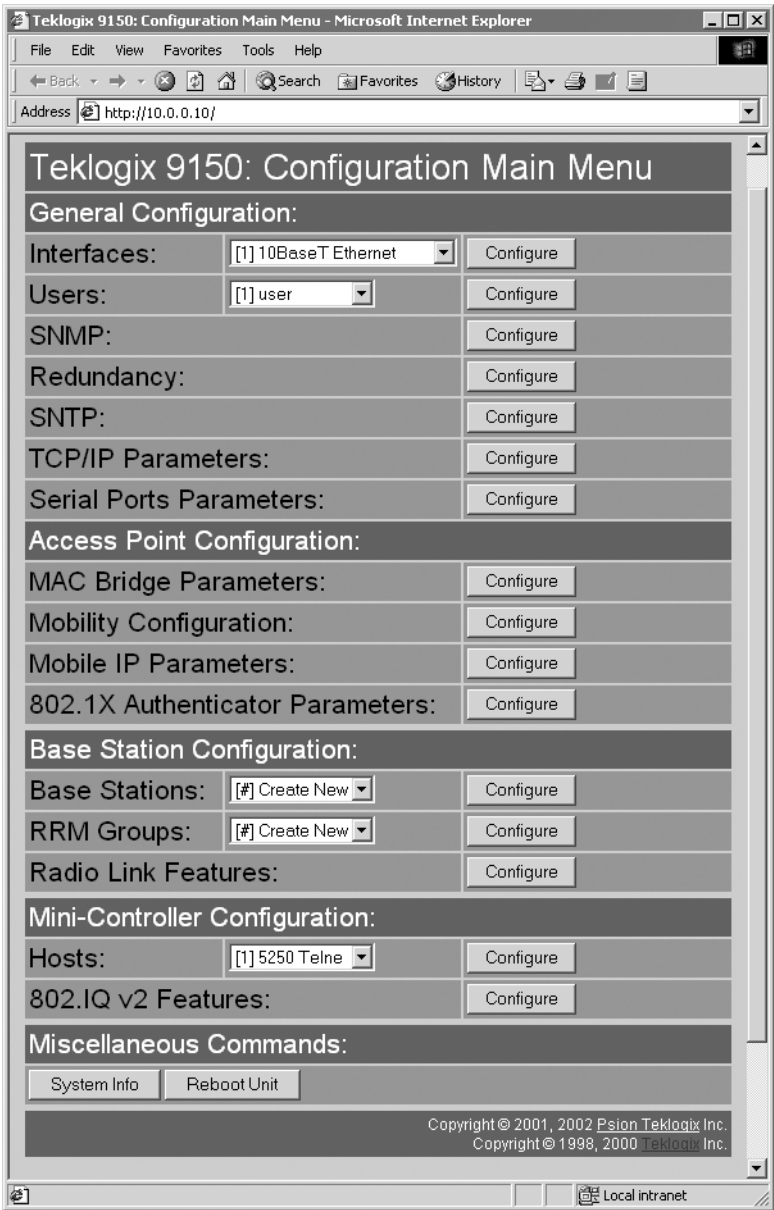> *Important: **Do not use the web browser's <Back> button to leave a page.***

Figure 3.1 9150 Configuration Main Menu: View From Browser

3.4 General Configuration Menu Options

The *General Configuration* menu on the *Configuration Main Menu* page presents five options of sub-menus: *Interfaces*, *Users*, *SNMP, TCP/IP Parameters,* and *Serial Ports Parameters*.
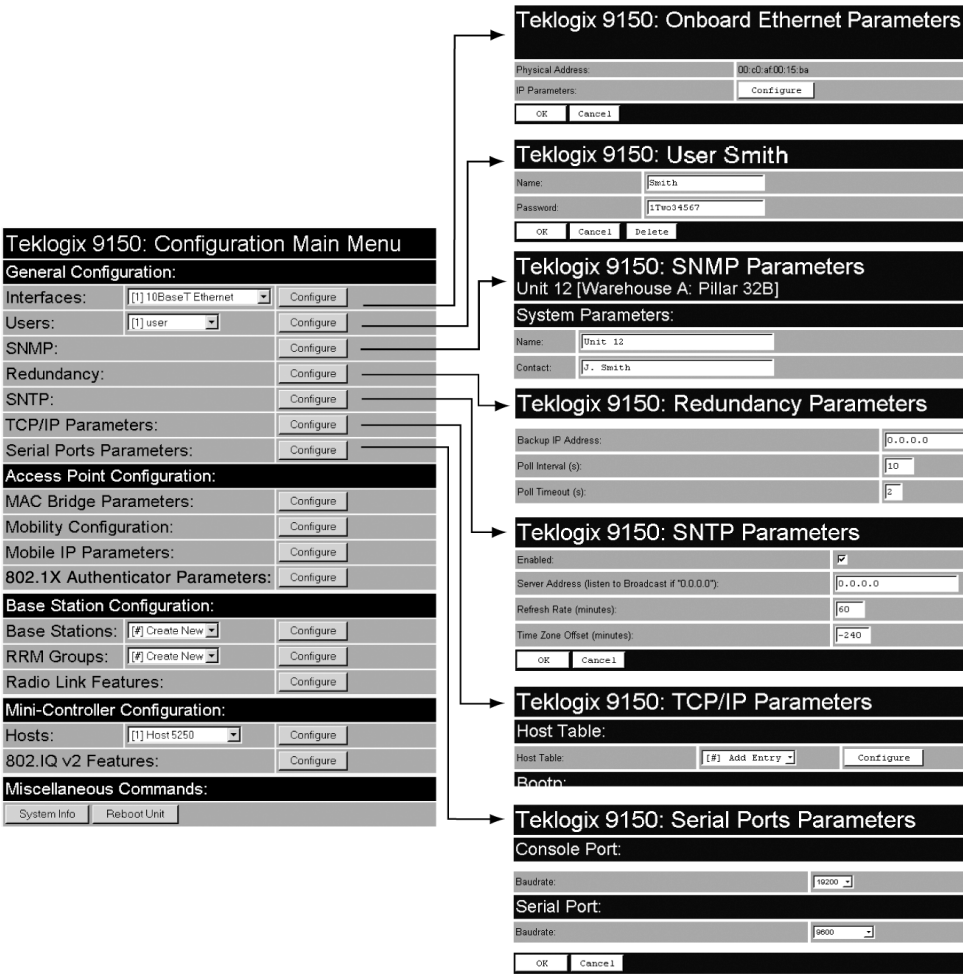

Figure 3.2 Overview Of General Configuration Menus

3.4.1 Interfaces

The pull-down menu shown for the Interfaces option indicates which interfaces
have been detected in use by the 9150.

3.4.1.1   10BaseT Ethernet

For the selection *10BaseT Ethernet*, entering the "Configure" dialog box will open
the *Onboard Ethernet Parameters* page for that Ethernet connection, which shows
the 9150's physical (hardware) address and IP address parameters.

Physical Address

A unique *Physical Address* is assigned by Psion Teklogix personnel for each 9150.
The values entered for this parameter are presented in hexadecimal in descending
order beginning with the MSB (Most Significant Byte), the highest value, and
ending with the LSB (Least Significant Byte), the lowest value. The allowable value
for each field ranges from **00** to **FF**.

Warning: ***It is not advisable to modify the* Physical Address. *However, if
these values are to be changed, the Network Administrator must
assign a unique address to each Ethernet station on the network,
including all 9150s.***

IP Parameters

Each 9150 that is connected to a local network has a unique IP address designated for it. The *10BaseT Ethernet IP Parameters* used to assign the IP address are accessed by entering the "Configure" dialog box.

Teklogix 9150: 10BaseT Ethernet IP
Parameters

| Current IP Address: | 10.0.0.10 | Default IP Address: | 10.0.0.10 |
| Current Subnet Mask: | 255.255.0.0 | Default Subnet Mask: | 255.255.0.0 |

OK   Cancel

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IP Address

The *Current IP Address* shown in the read-only field is the IP address currently set on the 9150. The *Default IP Address* text box allows you to change the value of the IP address.

The IP address must be a unique value on the network, so that each 9150 in your system can be identified. The acceptable value ranges from **0.0.0.0** to **239.255.255.255**.

Note: The value 255.255.255.255 is reserved for the broadcast address.

Subnet Mask

The *Current Subnet Mask* shown in the read-only field is the subnet mask currently set on the 9150. The *Default Subnet Mask* text box allows you to change the value of the subnet mask.

The 9150 uses the *Subnet Mask*, its own IP address, and the destination IP address to determine if a packet should be sent on the local network or to a remote segment. If the destination is found on the local network, the packet is sent directly to its destination. If the destination resides on a remote network, the packet is routed to the gateway. Enter your subnet mask in "**xxx.xxx.xxx.xxx**" notation.

Important: The maximum packet size supported is 1500 bytes. This parameter is not set at the 9150, but should be set at the host.

The acceptable values range from **0.0.0.0** to **255.255.255.255**.

3.4.1.2   100BaseT Ethernet

For the selection *100BaseT Ethernet*, entering the "Configure" dialog box will open
the *Onboard Fast Ethernet Parameters* page for that Ethernet connection, which
shows the 9150's physical (hardware) address, and give access to the IP address, and
Media Speed and Operating Mode parameters.

Physical Address

A unique *Physical Address* is assigned by Psion Teklogix personnel for each 9150.
The values entered for this parameter are presented in hexadecimal in descending
order beginning with the MSB (Most Significant Byte), the highest value, and
ending with the LSB (Least Significant Byte), the lowest value. The allowable value
for each field ranges from **00** to **FF**.

Warning: ***It is not advisable to modify the* Physical Address*. However, if
these values are to be changed, the Network Administrator must
assign a unique address to each Ethernet station on the network,
including all 9150s.***

IP Parameters

Each 9150 that is connected to a local network has a unique IP address designated for it. The *IP Parameters* used to assign the IP address are accessed by entering the "Configure" dialog box.

Teklogix 9150: 100BaseT Ethernet IP Parameters

| Current IP Address: | 10.0.0.10 | Default IP Address: | 10.0.0.10 |
| Current Subnet Mask: | 255.255.0.0 | Default Subnet Mask: | 255.255.0.0 |

OK   Cancel

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IP Address

The *Current IP Address* shown in the read-only field is the IP address currently set on the 9150. The *Default IP Address* text box allows you to change the value of the IP address.

The IP address must be a unique value on the network, so that each 9150 in your system can be identified. The acceptable value ranges from **0.0.0.0** to **239.255.255.255**.

*Note: The value **255.255.255.255** is reserved for the broadcast address.*

Subnet Mask

The *Current Subnet Mask* shown in the read-only field is the subnet mask currently set on the 9150. The *Default Subnet Mask* text box allows you to change the value of the subnet mask.

The 9150 uses the *Subnet Mask*, its own IP address, and the destination IP address to determine if a packet should be sent on the local network or to a remote segment. If the destination is found on the local network, the packet is sent directly to its destination. If the destination resides on a remote network, the packet is routed to the gateway. Enter your subnet mask in "**xxx.xxx.xxx.xxx**" notation.

Important: The maximum packet size supported is 1500 bytes. This parameter is not set at the 9150, but should be set at the host.

Media Speed and Operating Mode

You can choose the operational mode of the 9150T by selecting the media speed, either 10 or 100 Mbps, and the operational mode, either full or half duplex. If the parameter value is left at the default, **Auto detection**, the 9150T's physical interface will be detected, and the speed and mode will be set automatically.

Teklogix 9150: Onboard Fast Ethernet
Parameters

Physical Address:	00:c0:af:00:15:ba
IP Parameters:	Configure
Media Speed and Operating Mode:	Auto detection

Auto detection
100 Mbps Full Duplex
100 Mbps Half Duplex
10 Mbps Full Duplex
10 Mbps Half Duplex

OK   Cancel

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Select the media speed and mode from the drop-down list. The values are:
Auto detection, **100 Mbps Full Duplex**, **100 Mbps Half Duplex**, **10 Mbps Full Duplex,** or **10 Mbps Half Duplex**.

The default value is **Auto detection**.

Important: *If the mode chosen for the 9150 is incorrect, it will become inaccessible from the network when it is rebooted. If this occurs, the 9150 will have to be re-configured using the console.*

3.4.1.3   Slot n: PC Card Radio

Each PC Card (PCMCIA Card) radio resident in the 9150 will be located in one of two Slots: A or B. Selecting a PC card will open the sub-menu for that radio.

IEEE 802.11 DS: See "IEEE 802.11 Direct Sequence Radio Parameters Menu" on page 66 for details on setting the radio parameters for the PC card.

TekLAN Card: See "TekLAN Parameters" on page 110 for details on setting the radio and Wlan parameters.

Teklogix Narrowband: See "Narrow Band Radio Parameters" on page 114 for details on setting the radio and polling parameters.

3.4.2 Users

The Users option provides security for access to the 9150 Configuration menus. New individuals and their passwords can be added by selecting "[#] Create New" in the listbox before entering the "Configure" dialog box.

Name

The name should be comprised of alphanumeric characters only, is case-sensitive, and should not contain spaces. The minimum length of the name is 4 characters, the maximum length is 32 characters.

The default value is **user.**

Password

The password should be comprised of alphanumeric characters only, is case-sensitive, and should not contain spaces. The minimum length of the password is 6 characters, the maximum length is 32 characters.

The default value is **123456**.

Individual names and their assigned passwords may be changed or deleted in the "Configure" dialog box for this option by selecting the name in the listbox and then opening the "Configure" dialog box.

```
Teklogix 9150: User Smith
Name:              Smith
Password:          1Two34567
   OK     Cancel    Delete
```

3.4.3 SNMP

SNMP (Simple Network Management Protocol) is the protocol that governs network management and the monitoring of network devices and their functions, including those in MapRF systems.

3.4.3.1 MapRF

The 9150 is fully compatible with Psion Teklogix' MapRF network management software. For complete details on MapRF, please refer to the *MapRF User Guide*. Manual configuration of a 9150 in a MapRF system is minimal. The following parameters must be correctly configured:

- "10BaseT Ethernet" on page 36 and "100BaseT Ethernet" on page 38. The IP address, default gateway and subnet mask must be correctly configured for MapRF, either directly in the web pages or dynamically through DHCP/Bootp (see "Network Interface Configuration Protocol" on page 54).

- SNMP must be enabled (see page 44).

Some parameters may need to be configured, depending on your firmware version. These are listed below. To determine whether the firmware version in your 9150 already supports these parameters through SNMP, please contact Psion Teklogix Support Services (see Appendix A: "Support Services And Worldwide Offices").

- "Serial Ports Parameters" on page 58.
- "Mobile IP Configuration" on page 99.
- "TekLAN Parameters" on page 110.
- "Narrow Band Radio Parameters" on page 114.

- "RRM Groups" on page 128.

The SNMP "Configure" page, entered from the *Configuration Main Menu* page, allows various network management parameters to be set or changed.

Teklogix 9150: SNMP Parameters			
System Parameters:			
Name:			
Contact:			
Location:			
Enabled:	☑		
Enable Proxy for non-IP terminals:	☐		
Proxy throttling:	Disabled ▼		
SNMP Communities and Trap Receivers:			
Number:	Name:	IP Address:	Access:
1	public	0.0.0.0	read_only ▼
2	private	0.0.0.0	read_write ▼
3		0.0.0.0	read_only ▼
4		0.0.0.0	read_only ▼
5		0.0.0.0	read_only ▼
6		0.0.0.0	read_only ▼
OK Cancel			
		Copyright © 1998, 2001 Psion Teklogix Inc.	

3.4.3.2   System Parameters

Name, Contact, Location

The entries in these parameters set the name, contact and location identifiers for this specific 9150 Wireless Gateway. The entries should be of 7-bit, US-ASCII character type and not more than 78 characters. The name and location are then shown as the sub-heading of each Configuration page. In the following example the identifier appears as "Unit 12 [Warehouse A: Pillar 32B]".

Teklogix 9150: Configuration Main Menu
Unit 12 [Warehouse A: Pillar 32B]

General Configuration:		
Interfaces:	[1] 10BaseT Ethernet ▼	Configure
Users:	[1]　user ▼	Configure
SNMP:		Configure

Enabled

When this parameter is **enabled** (√), the 9150 will respond to SNMP inquiries and provide SNMP information. For the 9150 to operate with MapRF, the checkbox must be enabled. The default setting is **enabled**.

3.4.3.3   Enable Proxy for non-IP terminals

When this parameter is **enabled** (√), the 9150 acts as a proxy within the MapRF manager, for managing terminals without IP addresses. This option should be used only when the 9150 is acting as the Cellular Master (mini-controller).

3.4.3.4   Proxy throttling

To ensure that increased radio traffic due to the 9150 acting as proxy does not create a problem, the amount of traffic can be controlled by setting it to **100**, **500**, or **1000** bytes per second. The default is **Disabled**.

Enable Proxy for non-IP terminals:	☐		
Proxy throttling:	Disabled ▼		

SNMP Communit[Disabled / 100 Byte/s / 500 Byte/s / 1000 Byte/s]ap Receivers:

Number:		IP Address:	Access:
1	public	0.0.0.0	read_only ▼

3.4.3.5   SNMP Communities and Trap Receivers

These parameter settings allow the network administrator to define the network environment and determine the type of access allowed (**read_only** or **read_write**) for each area name and IP address. The *Name* entries should be of 7-bit, US-ASCII character type and not more than 255 characters. The **trapDest** IP addresses determine which SNMP manager's stations will receive SNMP Traps from the 9150.

The 9150 sends the "Cold Start" Trap on reboot or power up.

⚠ ***Important:*** ***Any parameters that are changed in the SNMP Communities and Trap Receivers menu must also be changed in the MapRF manager.***

SNMP Communities and Trap Receivers:			
Number:	Name:	IP Address:	Access:
1	public	0.0.0.0	read_only ▼
2	private	0.0.0.0	read_only / read_write / trapDest
3		0.0.0.0	read_only ▼
4		0.0.0.0	read_only ▼

3.4.4 Redundancy

The Redundancy Parameters "Configure" page, entered from the *Configuration Main Menu* page, allows the user to set various options for the redundant (backup) operation of the 9150.

This feature enables two similarly-configured 9150s to operate in parallel. One 9150 is designated as the *primary* 9150, and manages communication to the rest of the Teklogix system. The other 9150 is designated as the *secondary* 9150, and remains idle. Both 9150s communicate with one or two *arbiters*, extremely stable devices on the network, such as a host, which serve as a reference for the status of the network itself.

Both the primary and secondary 9150s must be connected to the network, and each 9150 is aware of the other's IP address. The secondary 9150 polls the primary 9150, and the primary 9150 responds, exchanging information about their status. There may not be more than one secondary 9150.

If the secondary 9150 cannot communicate with the primary 9150, but can communicate with one or both arbiters, it assumes that the primary 9150 is not working. It then becomes the primary and assumes control of the Teklogix backbone on the network.

When the first 9150 comes online again, it assumes secondary status while the second 9150 continues as the primary. If the 9150s cannot communicate with the arbiter, they assume that the network is not working.

> *Important:* **Both 9150s must be configured identically, with the exception of their unique IP addresses and the Backup IP Address *parameter, which is the IP address of the other 9150.***

> *Note:* *When control of the Teklogix system is passed from one 9150 to the other, sessions between hosts and terminals are closed, and terminals and bases are reset.*

Teklogix 9150: Redundancy Parameters

Enabled:	☐
Preferred Primary:	☑
Backup IP Address:	0.0.0.0
Poll Interval (s):	10
Poll Timeout (s):	2
Poll Tries:	3
Alias IP Address:	0.0.0.0
Arbiter 1 IP Address:	127.0.0.1
Arbiter 2 IP Address:	0.0.0.0

OK   Cancel

Enabled

When this checkbox is **enabled** (√), the 9150 uses the Redundancy feature. A second 9150, appropriately configured, and arbiters must be present on the network for the feature to operate properly.

The default is **disabled**.

Preferred Primary

This parameter decides which 9150 becomes primary if both want to be primary. The checkbox should be **enabled** (√) in only **one** of the redundant pair of 9150s.

The default is **enabled**.

Backup IP Address

The *Backup IP Address* parameter contains the address of the other 9150 with which this 9150 communicates. The default value is **0.0.0.0**.

Note: *The Backup IP address cannot be the same as the Alias IP address (page 48).*

Poll Interval, Poll Timeout And Poll Tries Parameters

The next three parameters are closely related. When this 9150 acts as the *secondary* device, it polls the primary 9150 at intervals specified by the *Poll Interval* parameter. After each poll, this 9150 waits for a reply for the length of time specified by the *Poll Timeout* parameter. If there is no reply during this time period, the 9150 sends another poll to the other 9150. The total number of polls sent while this 9150 waits for the response is specified by the *Poll Tries* parameter. If no response is received to the polls, the 9150 then pings the arbiter(s) to determine the status of the network.

Poll Interval

This parameter contains the interval, in seconds, at which this 9150 communicates with the other 9150.

The range of values is **1** to **9999**, the default is **10**.

Poll Timeout

This parameter contains the interval, in seconds, during which this 9150 waits for a reply after sending a poll to the other 9150. If there is no reply, it sends another poll to the other 9150.

The range of values is **1** to **9999**, the default is **2.**

Poll Tries

This parameter contains the number of times this 9150 will re-send a poll to the other 9150, before assuming that it cannot be reached.

The usable range of values is **2** to **7**, the default is **3**. The value can go as high as 9.

Alias IP Address

This parameter contains the alias IP address, identical for both this and the other 9150 in the redundancy system. The primary 9150 presents the alias IP address to the network, as well as its own unique IP address. The secondary 9150 only presents its unique IP address to the network.

When the secondary 9150 becomes the primary, it starts to use the alias IP address as well as its unique address, while the other 9150 stops using the alias IP address.

Wireless devices in the system which communicate directly with the Teklogix network controller's IP address, such as terminals using TCP Direct, may communicate with the alias IP address. They will then communicate with whichever of the two redundant 9150s is the primary.

This address must be the same on both the primary and secondary 9150.

The default address is **0.0.0.0**.

Note: *The Alias IP address cannot be the same as the Backup IP address (page 47).*

Arbiter 1 IP Address

This parameter contains the address of a device on the network which is known to be reliable. Both 9150s ping this device; if they receive no reply, they ping Arbiter 2 if so configured (see page 48), otherwise they assume that the network is not operating. This address should be the same on both the primary and secondary 9150s.

Arbiter 1 must always be configured when Redundancy is enabled. The default value is the loop-back address **127.0.0.1**.

Arbiter 2 IP Address

This parameter contains the address of an optional second device on the network which is known to be reliable. Both 9150s ping this device if they receive no reply from Arbiter 1. If they receive no reply from Arbiter 2, they assume that the network is not operating. This address should be the same on both the primary and secondary 9150s. If the default address is configured, Arbiter 2 won't be used in the protocol.

The default address is **0.0.0.0**.

3.4.5   SNTP

SNTP (Simple Network Time Protocol) is the protocol that enables the network to maintain an accurate system time. The SNTP Parameters "Configure" page, entered from the *Configuration Main Menu* page, allows the user to set the options.

Teklogix 9150: SNTP Parameters

Enabled:	☑
Server Address (listen to Broadcast if "0.0.0.0"):	0.0.0.0
Refresh Rate (minutes):	60
Time Zone Offset (minutes):	-240

| OK | Cancel |

Enabled

When this checkbox is **enabled** (√), the 9150 automatically sends requests to the SNTP server to retrieve the time in GMT (Greenwich Mean Time) format. The 9150 then sets the current local time using the *Time Zone Offset* value (see page 49).

The default is **enabled**.

Server Address

This parameter contains the IP address of the SNTP server. If the server address is specified, the 9150 sends unicast messages to the server to retrieve the time. If the address is not specified (i.e. 0.0.0.0.), the 9150 retrieves the broadcast messages.

The default value is **0.0.0.0**.

Refresh Rate

This parameter contains the interval, in minutes, at which the 9150 retrieves the time. The range of values is **1** to **1440** minutes. The default value is **60**.

Time Zone Offset

The *Time Zone Offset* is the difference between the GMT and the local time where the 9150 is located. If you are not sure of your time zone offset, you can get the GMT by using the console command " ?T " five minutes after booting up the 9150.

The 9150 will retrieve the GMT and you can determine the offset value.

The range of values is **-1339** to **1339** minutes. The default value is **-240**.
(This default represents Eastern Standard Time, Canada, with Daylight Saving.)

Note: The 9150 does not automatically compensate for Daylight Saving time.

3.4.6 TCP/IP Parameters

If the 9150 is situated on a wired network, it uses TCP/IP. A Routing Table, Host Table, DHCP, Bootp, and DNS options are available to resolve IP addressing issues.

Note: The term host *in this context refers to any device with an IP address, including parts of the Teklogix system such as controllers, the 9150, and associated base stations.*

This use of host is common in the networking field. It should be distinguished from Psion Teklogix's use of host *versus* terminal.

Teklogix 9150: TCP/IP Parameters

Route Table:

Routing Table:	[#] Add Entry ▾	Configure

Host Table:

Host Table:	[1] localhost ▾	Configure
Host Table Entries:	Never Expire ▾	
Host Table Entry Maximum Age [seconds]	600	

Network Interface Configuration Protocol:

Network Interface Configuration Protocol:	None ▾
DHCP Lease Time: [days]	0
Default Gateway Address:	10.128.0.1 10.128.0.1

DNS:

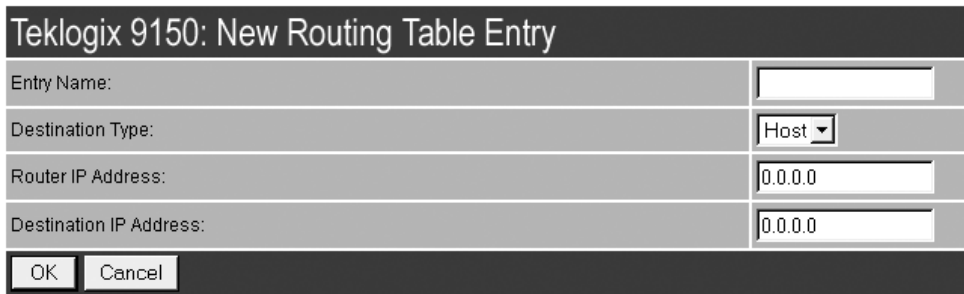| DNS Resolver Enabled:	☐
DNS Default Domain:	default.com
DNS Name Server 1:	0.0.0.0
DNS Name Server 2:	0.0.0.0

OK   Cancel

3.4.6.1   Route Table

Routing Table

The routing table is used when the 9150 and the host are not connected directly on a single physical network segment.

Packets are routed between network segments to the network connections, depending on the packets' destination addresses and on the contents of the 9150's Host and Routing tables.

To add an entry to the 9150's routing table, select "Configure" beside "[#] Add Entry" in the listbox. This will open the *New Routing Table Entry* menu.

Teklogix 9150: New Routing Table Entry	
Entry Name:	
Destination Type:	Host ▾
Router IP Address:	0.0.0.0
Destination IP Address:	0.0.0.0
OK Cancel	

New Routing Table Entry

Entry Name
This is the designated name of the entry.

Destination Type
Select a destination type for this entry from the drop-down list, either **Host** or **Net**.

Router IP Address
Enter the router's IP address in this textbox. This device must be on the same subnet as the 9150, and must be capable of sending packets to the host. If the host is on the same subnet as the 9150, enter its address here and in the *Destination IP Address* textbox.

Destination IP Address
Enter the IP address of the host. If the host is on the same subnet as the 9150, enter its address here and in the *Router IP Address* textbox.

3.4.6.2   Host Table

If no external DNS server is available, the 9150 may resolve host names to IP addresses using its internal host table.

Host Table:		
Host Table:	[#] Add Entry ▾	Configure
Host Table Entries:	Never Expire ▾	
Host Table Entry Maximum Age [seconds]	600	

Host Table

Hosts are added to the table by selecting "Configure" beside "[#] Add Entry" in the listbox. This will open the *New Host Table Entry* menu where a new host name and IP address can be entered.

Teklogix 9150: New Host Table Entry	
Name:	Host2
IP Address:	127.0.0.1
OK Cancel	

An existing host's name and IP address may be edited in the *Host Table Entry* menu by selecting "Configure" beside the host name in the listbox.

Host Table:		
Host Table:	[0] Host2 ▾	Configure
Host Table Entries:	[#] Add Entry [0] Host2	
Host Table Entry Maximum Age [seconds]	600	

The host may also be deleted from the table. When choosing to delete a host, you will be prompted for confirmation of the deletion, which will give you the opportunity to cancel the action.

Teklogix 9150: Host Table Entry for Host2

Name:	Host2
IP Address:	127.0.0.1

OK	Cancel	Delete

Name

This is the designated name of the host.

Note: The name must not contain space characters.

IP Address

This is the assigned IP address for the host.

Host Table Entries

Host Table:		
Host Table:	[#] Add Entry	Configure
Host Table Entries:	Never Expire	
Host Table Entry Maximum Age [seconds]	Are Not Cached / Never Expire / Expire	

Bootp:

This parameter allows you to determine the behaviour of the host name cache. The allowable settings are: **Expire**, **Are Not Cached**, and **Never Expire**. If Expire is selected, a timeout length determines how long the cached entries will remain in the table (see parameter, "Host Table Entry Maximum Age", below).

The default setting is **Never Expire**.

Host Table Entry Maximum Age (seconds)

This parameter allows you to set the expiry time limit (in seconds) for the host name cache when the *Host Table Entries* parameter is set to **Expire**.

The minimum allowable value is **30**. The default value is **600**.

3.4.6.3 Network Interface Configuration Protocol

Network Interface Configuration Protocol:	
Network Interface Configuration Protocol:	None ▼
DHCP Lease Time: [days]	0
Default Gateway Address:	10.128.0.1 10.128.0.1

The 9150 has designated default IP addresses for itself and the network Gateway. Alternatively, the IP address of the 9150 can be assigned by either a DHCP Server or BOOTP Server, if one is appropriately configured on the network.

If either the **DHCP** or **BOOTP** option is chosen from the *Network Interface Configuration Protocol* drop-down list, the 9150 will broadcast a request to the appropriate server, as described in the following sections.

The default setting is **None**.

⚠️ *Important:* ***Once the 9150 is configured and rebooted the first time, the*** **Network Interface Configuration Protocol** ***parameter should be disabled (set to*** **None***), unless the 9150 obtains its IP address from a DHCP or bootp server, or unless the system administrator intends to update the software through bootp.***

Network Interface Configuration Protocol:	
Network Interface Configuration Protocol:	None ▼
DHCP Lease Time: [days]	None / DHCP-Ethernet
Default Gateway Address:	BOOTP-Ethernet

DHCP

The **D**ynamic **H**ost **C**onfiguration **P**rotocol provides a mechanism for allocating IP addresses dynamically so that addresses can be reused when hosts no longer require them, and also ensures that a particular address is not duplicated. The 9150 can obtain the following parameters from an appropriately configured DHCP Server: IP address, subnet mask, and IP address lease time (see *DHCP Lease Time* on page 55). The DNS Domain Name/Server IP addresses (see page 56) and SNTP Server IP address (see page 49) will also be requested from the DHCP Server.

Select **DHCP** for the 9150 to automatically broadcast a request for DHCP-configured addresses to all hosts on the local **Ethernet** network.

BOOTP

The primary purpose of the Bootstrap Protocol (BOOTP) is to assign a designated IP address to the appropriate 9150 on the network, and to update the 9150 software.

When the *BOOTP* option is selected from the *Network Interface Configuration Protocol* drop-down list, the 9150 automatically broadcasts a request for IP address, subnet mask, and flash image file name, to all hosts on the local **Ethernet** network, including the Wireless Distribution System (WDS) links.

BOOTP servers search the *bootptab* files for a hardware address match for the 9150 that initiated the request for address. (Bootptab files list each hardware address with a corresponding IP address, and the flash image file.) The host with a matching hardware address in its bootp table replies to the request, sending the appropriate IP address and, if needed, the image file to the 9150.

Software Upgrade Using TFTP

The 9150 software may be upgraded by using a TFTP server instead of BOOTP. Contact the TFTP server and download the new image file by connecting the 9150 to a PC console (for details refer to page 31) and entering the following command line:

```
>net tftp <servername><imagefile>
```

The image file will be loaded after the 9150 is rebooted.

Note: This command is available for all version C and later releases of software, and for version B55. Do not use if B52 is the current version of the software.

DHCP Lease Time

This parameter defines the length of time (in days) that the 9150 is requesting for the lease on its IP address and subnet mask. The default setting is **0** (zero), which requests the maximum lease time configured at the DHCP Server.

Default Gateway Address

The *Default Gateway Address* creates an identifiable communication link between the 9150 and a network other than the one to which the 9150 is directly wired. The Gateway Address shown in the read-only field is the address currently assigned by the network administrator. The text box allows you to change the value of the address.

The acceptable values for the Default Gateway IP address range from **0.0.0.0** to **239.255.255.255**.

Note: *Setting the Gateway IP Address to **0.0.0.0 disables** this feature. A communication link will not exist between sub-networks.*

3.4.6.4   DNS

Domain **N**ame **S**ystem allows users to locate destinations on the TCP/IP network by domain (host) name. The DNS server maintains a database of host names and their corresponding IP addresses. For example, if the server was presented with the name "www.teklogix.com", it would return the IP address: "207.219.2.3".

DNS:	
DNS Resolver Enabled:	☐
DNS Default Domain:	default.com
DNS Name Server 1:	0.0.0.0
DNS Name Server 2:	0.0.0.0
OK Cancel	

DNS Resolver Enabled

When this parameter is **enabled** (√), the 9150 will use the DNS Name Server identified by the IP address entered in the *DNS Name Server* parameter.

DNS Default Domain

This is the default domain name for this 9150.

DNS Name Server 1

This is the IP address of the first designated DNS Name Server. The DNS Resolver will first contact this server to resolve a name query. If the query isn't resolved, the DNS Resolver will then contact the second DNS Name Server.

DNS Name Server 2

This is the IP address of the second designated DNS Name Server.

3.4.7 Serial Ports Parameters

These parameters allow you to set the baud rates for the console port and the serial port. The Serial Ports Parameters "Configure" page, is entered from the *Configuration Main Menu* page.

3.4.7.1 Console Port

Baudrate:

The default baud rate for the console port is **19200 b/s**.

Modem Initialization String:

The 9150 sends this string of ASCII characters through the console port when it reboots.

Send It Now:

Select this checkbox to send the modem initialization string without rebooting the 9150. The 9150 sends the string when the user presses the OK button.

Default:

This is the default modem initialization string.

3.4.7.2   Serial Port

Baudrate: The default baud rate for the serial port is **19200 b/s**.

3.5 Access Point/Base Station/Mini-Controller Menus

The 9150 is capable of operating as a transparent bridge (access point) between the wireless and wired networks, and also as a mini-controller or base station. For these operations, the parameters in these pages must be set appropriately. For detailed information on the sub-menus and to set up the 9150 as a base station, see Chapter 5: "Base Station Configuration". To configure an access point device, see Chapter 4: "Access Point Configuration". To configure the 9150 as a mini-controller, see Chapter 6: "Mini-Controller Configuration".

3.6 Miscellaneous Commands Menu Options

There are two miscellaneous commands: *System Info* and *Reboot Unit*.

3.6.1 System Info

The System Information, hardware and software, for the 9150 Wireless Gateway unit is detected automatically and summarized in this page. The screen is shown on page 62.

Teklogix 9150: System Information

Device Model:	Teklogix 9150E
Unit Serial Number:	
Software Version:	D060O
Boot Code Version:	D059Q
System IP Address:	10.0.0.10
Ethernet Hardware Address:	00:c0:af:00:15:ba
Flash Size:	2097152 bytes.
SRAM Size:	16777216 bytes.
PC Card Slot A:	IEEE 802.11 DS [FCC-USA (0x10)]
PC Card Slot B:	TekLAN Card
Emulations:	enable

OK

3.6.2 Reboot Unit

This option opens a dialog box which allows you to remotely "warm" reboot the 9150.

Teklogix 9150: Reboot Unit?

Really reboot the 9150?

OK   Cancel

If the **OK** button is chosen, the 9150 will be rebooted, the LEDs will turn off momentarily, and the following message will be received:

Teklogix 9150: Rebooting...

The 9150 has been rebooted. After a few moments, it should be back on-line.

OK

⚠ *Important:* *If changing radio types in the 9150, and therefore changing the* **Radio Type** *parameter (see page 111), the unit must be powered OFF and ON again ("cold" rebooted). Rebooting with the* **Reboot Unit** *option will not implement the radio parameter change.*

ACCESS POINT CONFIGURATION **4**

4.1 Overview

The 9150 can operate as an access point device between wired networks and IEEE 802.11b wireless networks. Using IEEE 802.11b protocol, the 9150 provides a transparent bridge between Teklogix or client terminals and a network controller or host. For an overview of IEEE 802.11b, please refer to "IEEE 802.11b Protocol" on page 8. For operation as an access point, the parameters in the following pages must be set appropriately.

Note: The 9150 main parameters should first be set up as described in Chapter 3: "9150 Main Configuration".
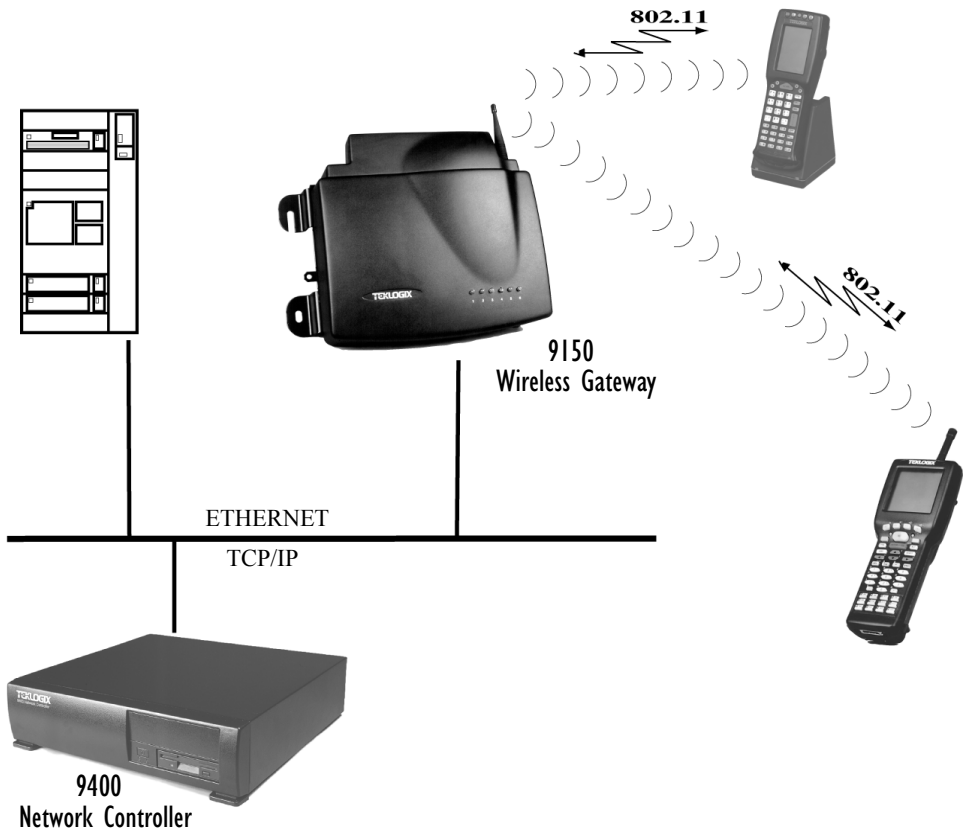

Figure 4.1 9150 Access Point Configuration

4.2   General Configuration Menu: Interfaces

The pull-down menu shown for the *Interfaces* option indicates which interfaces have been detected in use by the 9150, including any 802.11 PCMCIA radio:

- • IEEE 802.11 DS: Lucent WaveLAN IEEE 802.11 DSSS 2.4 GHz.

Teklogix 9150: Configuration Main Menu

General Configuration:

Interfaces:	[1] 10BaseT Ethernet	Configure
	[1] 10BaseT Ethernet	
Users:	[2] Slot A: IEEE 802.11 DS	Configure
	[3] Slot B: TekLAN Card	
SNMP:		Configure
Redundancy:		Configure
SNTP:		Configure
TCP/IP Parameters:		Configure
Serial Ports Parameters:		Configure

Access Point Configuration:

Selecting *IEEE 802.11 DS* radio type from the drop-down list and pressing "Configure" will open the radio parameters page for that radio.

4.2.1   IEEE 802.11 Direct Sequence Radio Parameters Menu

When the Lucent WaveLAN IEEE 802.11 DSSS 2.4 GHz PCMCIA card is installed in the 9150, the *IEEE 802.11 Direct Sequence Radio Parameter* screen shown on the next page is opened from the Interfaces main menu.

Teklogix 9150: Slot A - IEEE 802.11 Direct Sequence Radio Parameters

802.IQ version 1 Configuration:

802.IQ v1:	Configure

802.11 Radio Information:

Physical Address:	00:60:1d:04:b8:c8
AP Radio Name:	tkx9150
Regulatory Domain:	FCC-USA (0x10)
Fixed Multicast Rate:	Auto
WEP Implemented on the card:	NO
WEP Enable:	☐
HIDE WEP keys:	☐
WEP Tx Key:	1
WEP Encryption Key 1:	
WEP Encryption Key 2:	
WEP Encryption Key 3:	
WEP Encryption Key 4:	

Basic Service Set (BSS) Configuration:

Enabled:	☑
ESSID:	TEKLOGIX
Allow Broadcast ESSID:	☐
Channel:	10
Data Rate:	Auto

Wireless Distribution System (WDS) Configuration:

Enabled	MAC Address of remote AP
☐	00:00:00:00:00:00
☐	00:00:00:00:00:00
☐	00:00:00:00:00:00
☐	00:00:00:00:00:00
☐	00:00:00:00:00:00
☐	00:00:00:00:00:00

802.1X Authenticator Configuration:

Port Control:	Auto
Quiet Period:	60
Tx Period:	30
Supplicant Timeout:	30
Server Timeout:	30
Max Requests:	2
Transmit WEP Key:	☐
Reauthentication Enabled:	☐
Reauthentication Period:	3600

OK	Cancel

4.2.1.1   802.IQ Version 1 Configuration Menu

This parameter accesses the 802.IQv1 sub-screen that enables Psion Teklogix' pro-
prietary enhanced 802.11b protocol, as described in "802.IQ v1 Sub-Screen", below,
and in "Psion Teklogix' 802.IQ Protocol" on page 9. For information on 802.IQv2,
please refer to "802.IQ Version 2 Configuration" on page 201.

802.IQ v1 Sub-Screen

802.IQ is an optimized proprietary Psion Teklogix protocol that enables terminals to
operate on a wireless LAN in a network that supports both TCP/IP and 802.IQ pro-
tocol simultaneously.

802.IQv1 protocol is a wireless LAN protocol that provides greater performance in
an 802.11b wireless network than is possible with TCP/IP.

The 9150 bridges the 802.IQv1 wireless and TCP/IP wired networks. A terminal can
communicate with the 9150 access point using either TCP/IP or 802.IQv1 protocol.

⚠️ *Important:*   *802.IQ should only be enabled on wired 9150s.*

*Do not configure 802.IQ on wired 9150s bridging networks, since
802.IQ beacons would be sent through the WDS link from one
network to the other (see "Wireless Distribution System (WDS)
Configuration" on page 76).*

The *802.IQv1* sub-screen is entered from the *802.IQ version 1 Configuration* menu
on the IEEE 802.11 Direct Sequence Radio Parameters page.

```
Teklogix 9150: IEEE 802.11 DS Slot A -
802.IQ Parameters

802.IQ v1/v2 Common Features:

Auto Startup:                                    ☐

Beacon Period:                                   [2    ]

Terminal Offline Timeout:                        [5    ]

802.IQ v1 Configuration:

Enabled:                                         ☐

Initial RTT:                                      [1000 ]

Protocol Type ID:                                [2457 ]

Forward 802.IQ Packets Only:                      ☐

Give Higher Priority To 802.IQ Data:              ☑

  OK     Cancel
```

4.2.1.2   802.IQ v1/v2 Common Features Section

Auto Startup

This parameter **enables** (√) 802.IQ immediately when the 9150 is rebooted. When the 9150 is operating as a base station under a network controller or a 9150 mini-controller, this parameter must be **disabled**.

The default value is **disabled**.

⚠️ *Important: If* **Auto Startup** *is set incorrectly, terminals may not operate correctly.*

Beacon Period

An 802.IQ beacon is a broadcast sent out to all 802.IQ-enabled terminals. The beacon allows terminals to determine when they have roamed between base stations. It enables a terminal to determine whether or not the base station or controller

was rebooted and, if so, how to recover. If the controller was rebooted, the terminal closes all sessions and fully re-initializes. If the base station was rebooted, or if the terminal moved to a different 9150, a warm initialize is done (no data will be lost).

The *Beacon Period* parameter acceptable value ranges from **1** to **20** seconds. The default value is **2**.

Terminal Offline Timeout

This parameter sets the time (in minutes) before the 802.IQ task on the 9150 will send an offline message to the cellular master declaring the terminal offline.

The acceptable value ranges from **1** to **240**. The default value is **5**.

4.2.1.3   802.IQ v1 Configuration Section

Enabled

This parameter enables (√) or disables the 802.IQ feature. The default value is **disabled**.

Initial RTT

The parameter *Initial RTT* (Round-Trip Time) is used to help determine the elapsed time, in milliseconds, between an "*access point" transmission* and a "*terminal" acknowledgement*. The access point continuously adjusts the acceptable round trip time, calculating the average elapsed time over a number of transmissions for each terminal. If an acknowledgement takes longer to receive than the average round trip time calculated, the access point will resend the transmission.

Because access point(s) cannot calculate an *average* round trip time without a number of transmissions, a starting point or "Initial Round Trip Time" is required. The access point uses the time assigned to the "Initial RTT" parameter as a starting value for round trip calculations. Once the access point begins transmitting and receiving data to and from the terminal, this value will be adjusted to reflect the actual average round trip time between transmissions and acknowledgements.

The acceptable value ranges from **10** to **10000**. The default value is **1000**.

Protocol Type ID

This parameter identifies the 802.IQ protocol type, in order to avoid conflicts with other generated ethernet type packets that use the same protocol type.

The acceptable value ranges from **1501** to **65535**. The default value is **2457**.

> ⚠️ ***Important:*** ***The* Protocol Type ID** *default value is rarely changed. If the protocol type is changed, all terminal devices must be changed to match.*

Forward 802.IQ Packets Only

When bridging packets between the wireless and wired systems, this parameter enables the 9150 to automatically filter out and discard all non-802.IQ packets.

The default setting is **disabled**.

Give Higher Priority To 802.IQ Data

When **enabled** (√), this feature queues 802.IQ packets ahead of all other packet types (excluding voice packets, if applicable). If the parameter is **disabled**, 802.IQ packets are not prioritized and are treated like any other packet type.

The default setting is **enabled**.

4.2.1.4   802.11 Radio Information

The parameters in this section set general information about the Lucent WaveLAN IEEE 802.11 DSSS PCMCIA card installed in the 9150.

Physical Address

This parameter shows the hardware address (MAC address) of the radio card. A globally unique MAC address is assigned to each card by the card manufacturer. *The value cannot be changed.*

AP Radio Name

Some customer sites use Lucent's WaveManager/Client software to monitor access point (AP) radio coverage performance. To identify each AP, the monitor uses the radio card's name. The identification can be configured here to give each radio card a unique name.

The *AP Radio Name* is an alphanumeric character string of **up to 32** characters. The default value is **tkx9150**.

Regulatory Domain

The regulatory domain value identifies the regulatory body's country code for the RF regulations with which the radio complies. For the USA, the regulatory body is the FCC, for Canada it's Industry Canada, and for Europe it's ETSI. The hex value in brackets beside the name is the code (as specified in the IEEE 802.11b standard) for that domain. The country codes that are decoded into a name are listed below. For other country codes the name portion will be replaced with "Unknown".

Regulatory Body	Domain Code	Country
FCC-USA	0x10	USA (for DS radios this is also the code used for Canada)
Industry Canada	0x20	Canada (currently only for FH radios, this may change in the future)
ETSI-Europe	0x30	Most of Europe
Spain	0x31	Spain
France	0x32	France
MKK-Japan	0x40	Japan

Fixed Multicast Rate

This parameter allows you to choose the multicast rate of the installed 802.11, 2.4 GHz TRX7431 radio.

The allowable values for TRX7431 are: **Auto, 1**, **2**, **5.5**, or **11**Mb/s.

If **Auto** is chosen, the rate will automatically be set to the radio card's default multicast rate.

WEP Implemented on the card

This parameter shows whether the radio card installed on the 9150 supports the *Wired-Equivalent Privacy* feature, referred to as WEP. This feature allows you to encrypt radio traffic to prevent electronic eavesdropping. WEP is available in either 64-bit or 128-bit encryption for the TRX7431 radio. If WEP is not implemented by the radio card, the WEP parameters are non-functional.

The allowable values are **Yes** or **No**, and cannot be changed.

WEP Enable

Enabling (√) this parameter makes WEP available for the radio.

The default is **disabled**.

Hide WEP Keys

This parameter controls access to the WEP keys by replacing the visible key values with the hidden values " **** " when the option is enabled (√). To activate this feature, the WEP key values must first be entered and then submitted by pressing "OK" at the bottom of the page. Then, by going back into the *IEEE 802.11 Direct Sequence Radio Parameters* menu page (the key values will be visible), enable the Hide WEP Keys option, and submit the data again. This time you will see that the key values have been hidden. The feature is now set and remains enabled.

To disable the feature or change any of the WEP key values, you must enter and then submit ALL of the existing and/or new key values. When you go back to the menu pages, the key values will be visible again. The default is **disabled**.

WEP Tx Key

This parameter specifies which WEP Key the 9150 will use when transmitting.

The allowable values are **1** to **4**. The default value is **1**.

WEP Encryption Key 1 to 4

This parameter allows you to set the encryption key for either 64-bit or 128-bit encryption. Acceptable values for a key parameter are shown in Table 4.1.

64-bit Encryption	128-bit Encryption (available with TRX7431 radio only)
5 ASCII characters	13 ASCII characters
"0x", followed by 10 hex digits	"0x", followed by 26 hex digits

Table 4.1 WEP Encryption Key Values

Note: Although the user specifies 40-bit and 104-bit keys, these keys are actually composed with a 24-bit-long "Initialization Vector" generated inside the radio card, making up the 64- and 128-bit keys.

Important: **The 9150 must be rebooted for changes to these parameters to take effect.**

4.2.1.5   Basic Service Set (BSS) Configuration

The 9150 facilitates roaming of terminals across Basic Service Sets (BSS). For a
detailed description, please see "Inter-Access Point Protocol (IAPP)" on page 9.

Enabled

This parameter enables (√) or disables the BSS feature.

ESSID

This is the *Extended Service Set Identifier* parameter. The ESSID is an alphanumeric
character string of **up to 32** characters and is case-sensitive. If your network
includes devices that use the DOS ODI Driver, select alphabetical characters in
uppercase only to allow the DOS ODI devices to connect to the network as well.

Note: The ESSID should be the same for all devices in a system.

Allow Broadcast ESSID

This parameter enables (√) or disables the Broadcast ESSID feature. By default,
this parameter is unchecked: the association of stations that provide an ESSID that is
not equal to this 9150's ESSID is NOT allowed. This prevents the 9150 from being
associated with any station (802.11 device within radio range) that has its ESSID set
to "ANY" (the broadcast SSID).

The default is **disabled**.

Channel

This parameter sets the operating channel for this radio, as determined by the system
administrator. For a listing of the allowable channels for each country, please see
"PC Card Radios" on page 214.

Data Rate

The *Data Rate* parameter allows you to choose whether to fix the data rate (**Fixed n**) or set a maximum automatic transmission rate (**Auto n**) for the BSS channel of the installed TRX7431 radio. The data rate can also be configured to automatically use the maximum transmission rate possible for the radio (**Auto**).

⚠️ *Important: The 9150 must be rebooted for changes to this parameter to take effect.*

The range of values is: **Auto**, **Fixed 1**, **Fixed 2**, **Auto 2**, **Fixed 5.5**, **Auto 5.5**, or **Fixed 11**Mb/s.

The default setting is **Auto**.

4.2.1.6   Wireless Distribution System (WDS) Configuration

Wireless Distribution System (WDS) Configuration:	
Enabled	MAC Address of remote AP
☐	00:00:00:00:00:00
☐	00:00:00:00:00:00
☐	00:00:00:00:00:00
☐	00:00:00:00:00:00
☐	00:00:00:00:00:00
☐	00:00:00:00:00:00

The 9150 Wireless Gateway can be used as an 802.11b wireless access point (AP) to extend coverage area or for locations difficult to wire; or two 9150s can be used as an 802.11b bridge connecting two separate wired networks.

The 9150 access points are linked to each other in the Wireless Distribution System (WDS). To do this, each of the 9150s in the WDS must be configured to identify the other access points in the system, using their MAC addresses as described in the following parameter. Examples of various configuration scenarios are provided in Figure 4.2 on page 77 through Figure 4.5 on page 78.

📖 *Note: The Basic Service Set (BSS) operates independently of the WDS. However, the BSS and WDS share the same bandwidth. For information on BSS, please refer to "Basic Service Set (BSS) Configuration" on page 75.*

MAC Address Of Remote AP

Each wireless access point linked to this 9150 must be identified by entering its MAC address here, and the connection must also be enabled (√). Up to six WDS links can be supported. This 9150's MAC address must also be configured and enabled on each of the other access points linked to it in the Wireless Distribution System.

> *Important:* **If there are two radio cards in the wireless 9150 access point, one radio should be configured for the WDS link, and the other for BSS coverage. If both radio cards are set for the WDS, one will be automatically disabled.**

WDS-Link #	A	B
1	B's 802.11 MAC	A's 802.11 MAC
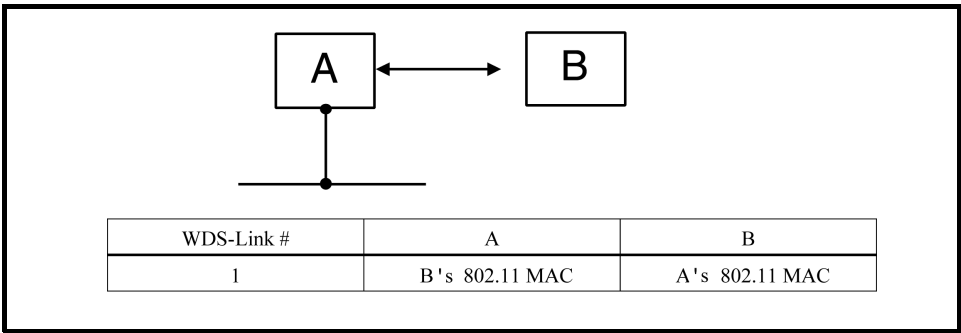
Figure 4.2 WDS Configurations: One Hop To The Backbone

WDS Link #	A	B	C
1	B's 802.11 MAC	A's 802.11 MAC	B's 802.11 MAC
2	not enabled	C's 802.11 MAC	not enabled
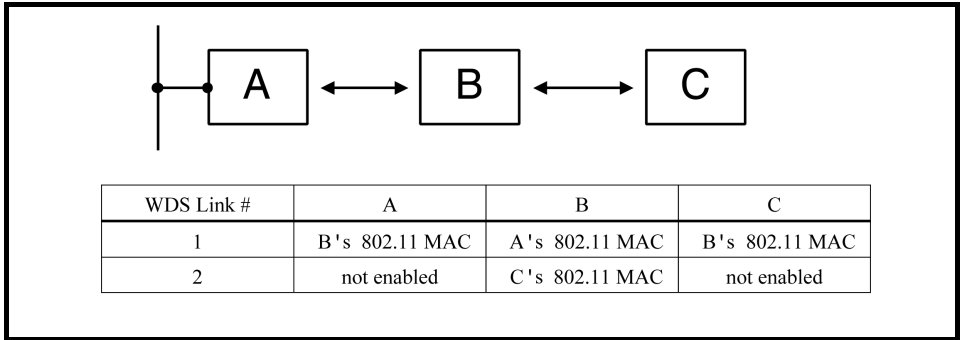
Figure 4.3 WDS: More Than One Hop To The Backbone

WDS Link #	A	B	C	D
1	B's 802.11 MAC	A's 802.11 MAC	A's 802.11 MAC	A's 802.11 MAC
2	C's 802.11 MAC	not enabled	not enabled	not enabled
3	D's 802.11 MAC	not enabled	not enabled	not enabled
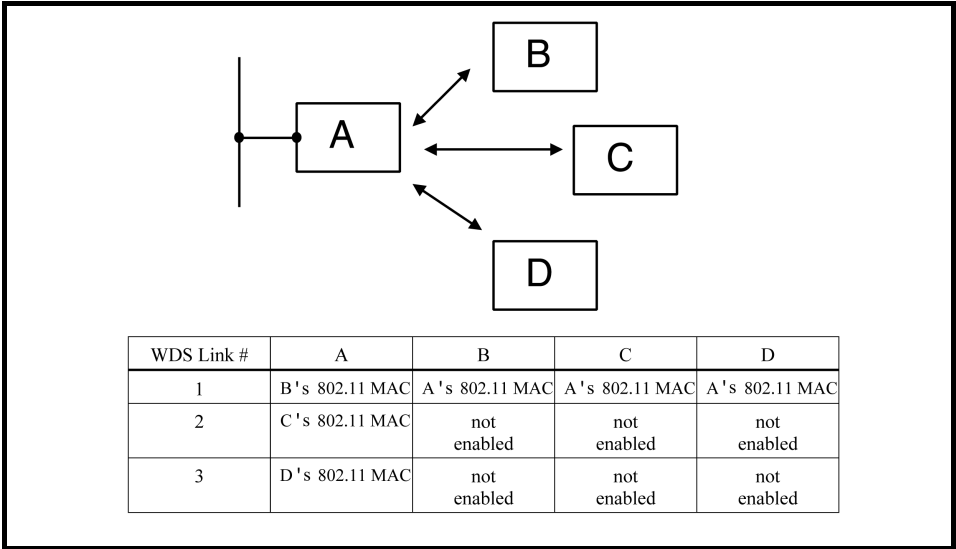
Figure 4.4 WDS: Multiple APs Connected To One AP On The Backbone

WDS Link #	A	B	C	D	E
1	B's 802.11 MAC	A's 802.11 MAC	B's 802.11 MAC	B's 802.11 MAC	B's 802.11 MAC
2	not enabled	C's 802.11 MAC	not enabled	not enabled	not enabled
3	not enabled	D's 802.11 MAC	not enabled	not enabled	not enabled
4	not enabled	E's 02.11 MAC	not enabled	not enabled	not enabled

Figure 4.5 WDS: Multiple APs Connected To Another Wireless AP

4.2.1.7   802.1X Authenticator Configuration

These parameters govern the configuration of the 9150 when it acts as an authenticator in an 802.1X system. 802.1X is an enhancement to 802.11 which provides greater security.

Mobile devices ("supplicants") request access to the wireless 802.11 network; the 9150, acting as an "authenticator", passes their requests on to a separate "authentication server".

If the server approves the authentication request, the 9150 opens a port for the supplicant, and then acts as a bridge, passing packets between the supplicant and the wired network. If the server denies the authentication request, the 9150 discards supplicant packets addressed to the wired network.

Port Control

This parameter specifies how the authenticator handles the port that it assigns to the supplicant. The default value is **Auto**. If this parameter is set to **ForceAuthorized**, the 9150 allows any supplicant to connect. If this parameter is set to **ForceUnAuthorized**, the 9150 allows no supplicant to connect.

Quiet Period

This parameter specifies the number of seconds during which the 9150 ignores authentication requests on a port, after receiving a message denying connection from the authentication server. Using this delay makes brute force attempts to break security less practical. The default value is 1 second.

TX Period

This parameter specifies the retransmit time for authentication requests from the supplicant during establishment of authentication. The default is 30 seconds.

Supplicant Timeout

After this number of seconds, the 9150 decides that the supplicant is not responding to messages during the authentication process. The default value is 30 seconds.

Server Timeout

When the 9150 does not receive a response from the authentication server after this number of seconds, the 9150 assumes that the authentication server (the RADIUS server) is down or not able to respond. It sends an "authentication failed" message to the supplicant. The default value is 30 seconds.

Max Requests

This is the maximum number of times the 9150 will retransmit an EAP request to a supplicant before it ends the current authentication session. The default value is 2.

Transmit WEP Key

When this parameter is enabled (√), the 9150 relays to the supplicant the "session key" received from the RADIUS server. For this feature to work, the supplicant must be capable of using the TLS authentication method.

Reauthentication Enabled,
Reauthentication Period

When the Reauthentication Enabled parameter is checked (√), the 9150 requires connected devices (clients) to reauthenticate themselves after the period of time (in seconds) specified by Reauthentication Period. The default values are **disabled** and **3600**.

4.3 Access Point Configuration Menu Options

The Access Point Configuration main menu consists of four sub-menus:
MAC Bridge Parameters, *Mobility Configuration*, *Mobile IP Parameters*, and
802.1X Authenticator Parameters.
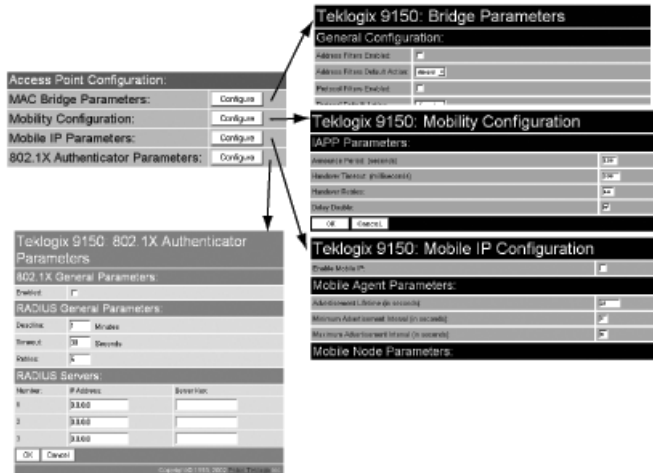
4.4 MAC Bridge Parameters

The MAC Bridge parameters consist of protocol filters that direct the 9150 to
forward or discard frames that contain a known protocol type. This enables the 9150
to be selective of what types of frames will be bridged over the radio, in order to
limit traffic on busy networks. Filtering frames is based on the protocol information
in the frame. This is discussed in detail in "Protocol Filters" on page 89.

The *MAC Bridge Parameters* page is entered from the Access Point Configuration
menu on the first page, as shown above.

Figure 4.6 on page 82 charts the pages for the MAC bridge filters. Entering "OK" or
"Cancel" in the individual Filter pages will return you to the *Bridge Parameters*
page.
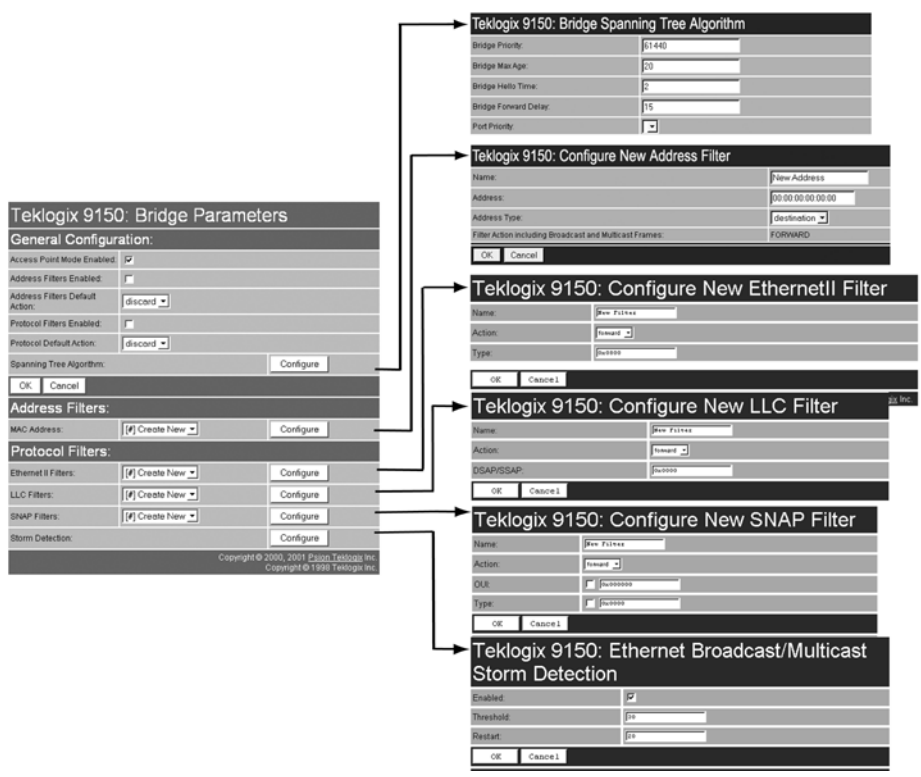
Figure 4.6 Overview Of MAC Bridge Configuration Menus

4.4.1 General Configuration

Teklogix 9150: Bridge Parameters	
General Configuration:	
Access Point Mode Enabled:	☑
Address Filters Enabled:	☐
Address Filters Default Action:	discard ▾
Protocol Filters Enabled:	☐
Protocol Default Action:	discard ▾
Spanning Tree Algorithm:	Configure
OK Cancel	

Access Point Mode Enabled

When this 9150 is used only as an 802.IQ base station and not as an access point, this parameter should be **disabled** to reduce CPU time. Only broadcast and multicast frames will be passed through. **Enable** (√) this parameter for the 9150 functioning as an access point.

The default value is **enabled**.

Address Filters Enabled

The checkbox in this parameter enables or disables the *Address Filters* function. If filtering is **enabled** (√), the 9150 can filter out frames based on destination MAC addresses. The list of MAC addresses for filtering is set by the *Address Filters* option on page 87. Frames are filtered and either forwarded or discarded, depending on the rest of the settings in this configuration. If filtering is **disabled**, no filtering will be done based on MAC addresses.

Address Filters Default Action

This parameter determines which *Address Filters Default Action* (**discard** or **forward**) will be performed when the *Address Filters Enabled* parameter is **checked** (√). If an address **does not match** any of the addresses set in the *Address Filters* configuration (see page 87), then it will take the *Address Filters Default Action* selected in this parameter.

For example, the *Address Filters Default Action* may be to **discard** all frames destined for addresses not matched in the configuration database. Therefore if the address type field is **not matched**, the frame will be discarded. But if an address type field is **matched** in the database, the frame will be forwarded for that address.

Conversely, if the default action is to **forward** all frames destined for addresses **not matched** in the configuration database, those frames will be passed on for those addresses, but frames for an address type field **matched** in the database will be discarded.

Protocol Filters Enabled

The checkbox in this parameter enables or disables the *Protocol Filters* function. If filtering is **enabled** (√), frames are filtered and either forwarded or discarded, depending on the rest of the settings in this configuration. If filtering is **disabled**, no filtering will be done based on protocol frames.

Protocol Default Action

This parameter determines which *Protocol Default Action* (*discard* or *forward*) will be performed when the *Protocol Filters Enabled* parameter is **checked** (√). Each Protocol Filter (see page 89) also has a *forward*/*discard* action associated with it. If a frame does not match any of the filters set in the *Protocol Filters* configuration, then it will take the *Protocol Default Action* selected in this parameter.

For example, the *Protocol Default Action* may be to *discard* all frames. If a type field is **matched** in the configuration database, and the Filters action is *forward*, the frame will be passed on. If the field **is not matched**, then the frame will be discarded. Therefore if you want only IP frames forwarded, after selecting the appropriate IP Type in the Ethernet II Filters (see page 92) the *discard* setting here will drop all frames containing other protocol types.

Important: **If Protocol Filters Enabled** *is* *checked***, and the Protocol Default Action** *is* *discard***, an HTTP browser will not be able to access the 9150's configuration pages unless an ARP filter is defined to** *forward* **ARP packets. To do this, configure Ethernet II Filters** *to* **forward protocol type** *0x0806* **(ARP) packets (see page 92). Alternatively, you can create a static entry in the ARP table on the computer that is running the browser.**

4.4.1.1   Bridge Spanning Tree Algorithm

The Spanning Tree Algorithm and its Bridge Protocol work to support and maintain
MAC Bridge performance.

⚠ *Important:* ***These parameters are set with optimum default values. Do not***
adjust these values without discussing the effects with your Psion
Teklogix representative.

Teklogix 9150: Bridge Parameters	
General Configuration:	
Access Point Mode Enabled:	☑
Address Filters Enabled:	☐
Address Filters Default Action:	discard ▾
Protocol Filters Enabled:	☐
Protocol Default Action:	discard ▾
Spanning Tree Algorithm:	Configure

Teklogix 9150: Bridge Spanning Tree Algorithm	
Bridge Priority:	61440
Bridge Max Age:	20
Bridge Hello Time:	2
Bridge Forward Delay:	15
Root Port Priority:	128
Set Port Priority:	Port Number: 0 Configure

OK   Cancel

Bridge Priority

This parameter helps a network manager select the active topology of the Bridged
Local Area Network by influencing the selection of the Root Bridge. The 2-octet
value is appended as the most significant portion of a bridge ID. A lower numerical
value for the bridge priority makes the bridge more likely to become the root.

The default value is **61440** (which equals 0xF000 in hexadecimal notation).

Bridge Max Age

The value of the Maximum Age parameter sent in a Configuration BPDU (Bridge Protocol Data Unit) when the 9150 is the Root or is attempting to become the Root.

The Maximum Age is the message age at which a received configuration message is judged "too old" and is discarded. If the selected value is too small, then occasionally the spanning tree will configure unnecessarily, possibly causing temporary loss of connectivity in the network. If the selected value is too large, the network will take longer than necessary to adjust to a new spanning tree after a topological event such as the restarting or crashing of a bridge or link. A conservative value is to assume a delay variance of 2 seconds per hop. The value recommended by IEEE 802.1d is 20 seconds.

The default value is **20**.

Bridge Hello Time

The time interval between the transmission of Configuration BPDUs by a 9150 that is the Root or is attempting to become the Root.

The recommended time is 2 seconds. Shortening the time will make the protocol more robust, in case the probability of loss of configuration messages is high. Lengthening the time lowers the overhead of the algorithm (because the interval between transmission of configuration messages will be larger).

The default value is **2**.

Bridge Forward Delay

The value of the Forward Delay parameter sent in a Configuration BPDU when the 9150 is the Root or is attempting to become the Root.

The Forward Delay temporarily prevents a bridge from starting to forward data packets to and from a link until news of a topology change has spread to all parts of a bridged network. This should give all links that need to be turned OFF in the new topology time to do so before new links are turned ON.

The default value is **15**.

Root Port Priority

The *Root Port Priority* parameter sets the initial priority value assumed by the Root Port. The default value is **128**.

Set Port Priority

The *Set Port Priority* parameter sets the prioritization of each enabled port. A lower numerical value for the port priority makes the port more likely to become the designated port. **Port Number 1** corresponds to the wired interface; **Port Numbers 2 to 7** correspond to WDSLinks 1 to 6. To set the priority, enter the port number in the textbox and then press the "Configure" button. Then enter the priority number for that port in the textbox.

Valid values range from **0** to **255**. The default value is **128**.

Teklogix 9150: Bridge Spanning Tree Algorithm

Bridge Priority:	61440
Bridge Max Age:	20
Bridge Hello Time:	2
Bridge Forward Delay:	15
Root Port Priority:	128
Set Port Priority:	Port Number: 0 Configure

Teklogix 9150: Port #0 Priority

Port priority:	128

OK   Cancel

4.4.2 Address Filters: MAC Address

The 9150 can use a list of destination MAC addresses to filter out frames. The MAC addresses are those of any terminals associating with the 9150. If *Address Filters Enabled* on page 83 is **checked** (√) and *Address Filters Default Action* (page 83) is set to **discard**, then any frame destined for any address in the list will be forwarded. If *Address Filters Default Action* is set to **forward**, then those frames will be discarded. Addresses are added to the filter list by entering the "Configure" dialogue box from the *Bridge Parameters* menu.

Address Filters:

MAC Address:	[#] Create New ▾	Configure

Teklogix 9150: Configure New Address Filter

Name:	New Address
Address:	00:00:00:00:00:00
Address Type:	destination ▾
Filter Action including Broadcast and Multicast Frames:	FORWARD

OK	Cancel

Name

This is any name you wish to use to describe this terminal.

Address

This parameter provides the corresponding MAC address for the terminal.

Address Type

This parameter defines whether the **source** or **destination** address of the frame should be used to determine the filter action. The destination address has priority over the sources address. Therefore, when a frame is filtered, if its destination address is set for discarding but its source address is set for forwarding, the frame will be discarded.

The default setting is **destination**.

Filter Action Including Broadcast And Multicast Frames

This parameter shows the filter action set in the "Address Filters Default Action" on page 83, which either forwards or discards frames based on the MAC address configured here. If the action is shown as "Forward", the frames for this address will be discarded. If the action is "Discard", the frames will be forwarded. The parameter is not configurable in this menu.

4.4.3 Protocol Filters

Protocol Filters:		
Ethernet II Filters:	[#] Create New ▾	Configure
LLC Filters:	[#] Create New ▾	Configure
SNAP Filters:	[#] Create New ▾	Configure
Storm Detection:		Configure

When the 9150 receives frames, it can forward or discard the messages by filtering the protocol Type fields encapsulated in the frame. The filtering is done on three types of Ethernet headers: Ethernet II, LLC and SNAP.

Figure 4.7 on page 90 illustrates the Ethernet header formats. The parameters to configure these filters are described in the sections which follow.

Note: Throughout these menus, the values for all the protocol types are, by convention, entered in hexadecimal, preceded by "0x".

The fields for a basic IEEE 802.3 Ethernet frame consist of a six-byte destination MAC address, followed by a six-byte source MAC address, and a two-byte protocol Type. The final fields in a frame are the Data field and the FCS field (Frame Check Sequence, or CRC). If the Type field contains a value that is greater than or equal to "0x0600", it is assumed to be the protocol identifier for an Ethernet II header. This field is used to determine which protocol is being used in the frame, and this is what can be filtered (see "Ethernet II Filters" on page 92).

If the protocol Type is less than "0x05DC", then the value is interpreted as a Length field instead. It is assumed that an IEEE 802.2 Logical Link Control (LLC) header is to follow the Length. This header consists of the **D**estination **S**ervice/**S**ource **S**ervice **A**ccess **P**oint (DSAP/SSAP) and Control fields (see "LLC Filters" on page 93).

If the DSAP and SSAP are both "0xAA", and the Control field has a value of "0x03", the LLC header will be followed by an extension which is a SNAP header. The SNAP header includes the Organizational Unit Identifier (OUI) and the protocol type (see "SNAP Filters" on page 94).
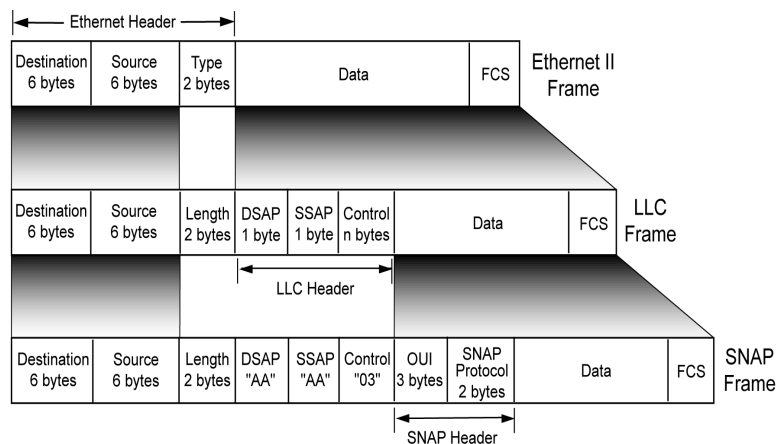
Figure 4.7 Ethernet Frame Types

The listboxes in the *Protocol Filters* option show the protocol filters already set in the configuration database. Selecting a protocol name and then opening the "Configure" dialog box gives a list of parameter settings that can be modified or deleted for that protocol.
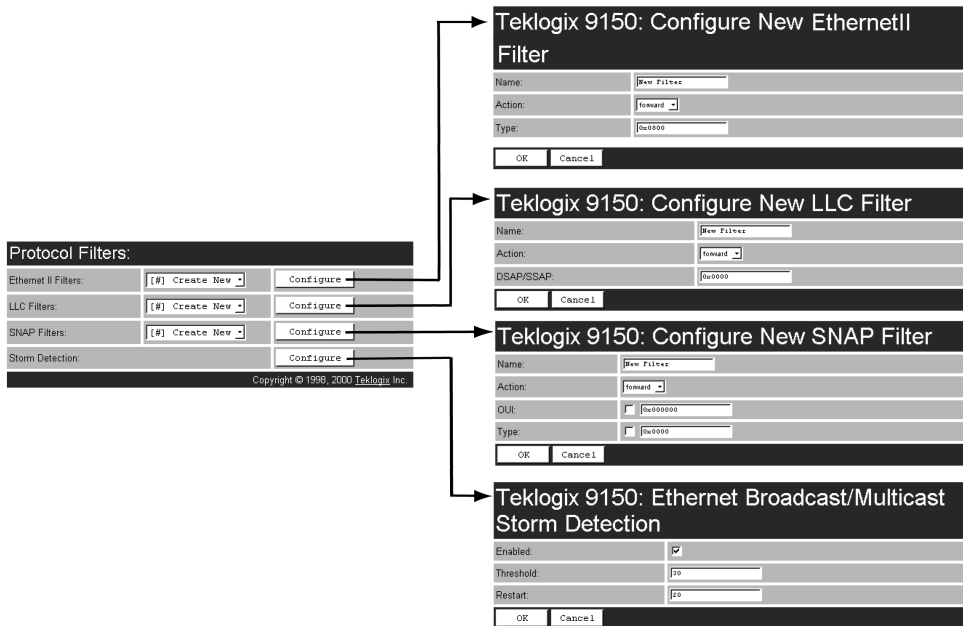
Figure 4.8 Protocol Filters Main Menu And Sub-menus

New filters can be added by selecting "[#] Create New" in the listbox before enter-
ing the "Configure" dialog box. Once a filter is created, the option to delete it can be
found on its configuration page (for example, see "Ethernet II Filters" on page 92).
When choosing to delete a filter, you will be prompted for confirmation of the dele-
tion, which will give you the opportunity to cancel the action.
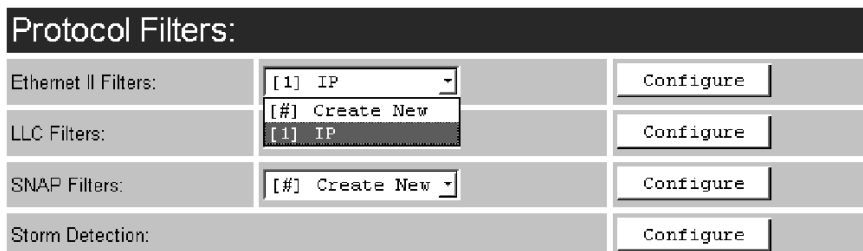
If a hexadecimal number is entered that is outside the minimum or maximum allowable value for these parameters, you will receive an alert that the Type value is invalid for the specified protocol.

Teklogix 9150: Bad Data

The submitted set of parameters was *not* written to the database because one or more of the parameters submitted were invalid.

The following parameter[s] were invalid:

- filter.ethernetII.1.etherType

OK

4.4.3.1   Ethernet II Filters

Teklogix 9150: EthernetII Protocol Filter

Name:	IP
Action:	forward
Type:	0x0800

OK   Cancel   Delete
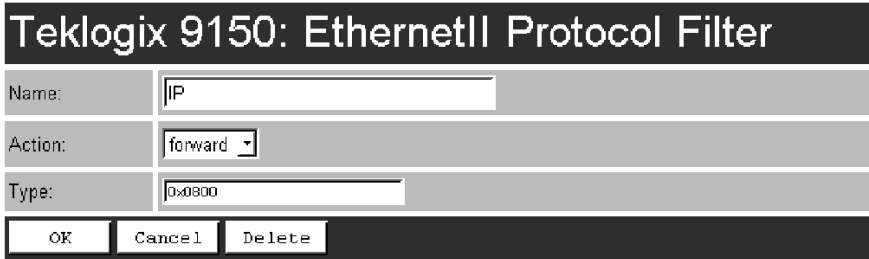
Name

This is any name you wish to use to describe this Ethernet II filter.
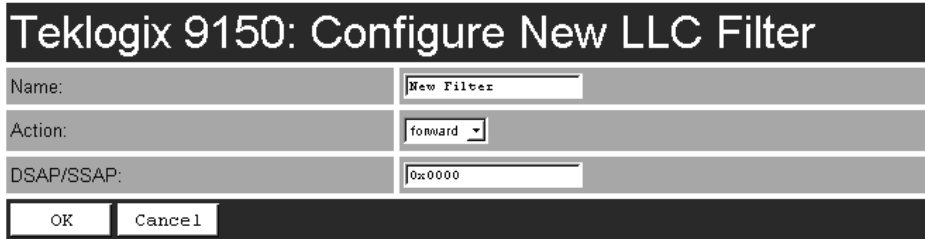
Action

This parameter can be set to either *forward* or *discard* frames with protocol types that match this filter.

Type

The value entered in this parameter must be a four-digit hexadecimal number ranging from **0x0600** to **0xFFFF**, which represents the Ethernet II protocol type you wish to filter. For example, if you only use TCP/IP, create two protocol filters, one to forward IP (Type 0x0800) and the other to forward ARP (Type 0x0806). For a listing of Ethernet II types, see "Ethernet II Types (RFC 1700)" on page C-1.

4.4.3.2   LLC Filters

Teklogix 9150: Configure New LLC Filter

Name:	New Filter
Action:	forward
DSAP/SSAP:	0x0000

OK	Cancel

Name

This is any name you wish to use to describe this LLC filter.

Action

This parameter can be set to either *forward* or *discard* frames with protocol types that match this filter.

DSAP/SSAP

The value entered in the ***D***estination ***S***ervice/***S***ource ***S***ervice ***A***ccess ***P***oint (DSAP/SSAP) parameter must be a four-digit hexadecimal number ranging from **0** to **0xFFFF**, where the first pair of digits is the DSAP and the last pair is the SSAP.

For a listing of DSAP/SSAP types, see "DSAP/SSAP Types" on page C-14.

4.4.3.3   SNAP Filters

Teklogix 9150: Configure New SNAP Filter

Name:	New Filter
Action:	forward ▾
OUI:	☐ 0x000000
Type:	☐ 0x0000

OK	Cancel

Name

This is any name you wish to use to describe this SNAP (**S**ub**N**et **A**ccess **P**rotocol) filter.

Action

This parameter can be set to either *forward* or *discard* frames with protocol types that match this filter.

OUI

The value entered in this parameter must be a six-digit hexadecimal number ranging from **0** to **0xFFFFFF**, which is the **O**rganization **U**nique **I**dentifier. When this parameter is **enabled** (√), the OUI will be filtered.

Type

The value entered in this parameter must be a four-digit hexadecimal number ranging from **0** to **0xFFFF**, which represents the SNAP type you wish to filter. When this parameter is **enabled** (√), this Type will be filtered.

For a short listing of OUI values, see "OUI Values" on page C-15.

4.4.3.4   Storm Detection

This filter parameter can prevent broadcast/multicast storms from spreading throughout the network. Network storms can burden radio traffic with unnecessary data transmissions.

Teklogix 9150: Ethernet Broadcast/Multicast Storm Detection	
Enabled:	☑
Threshold:	200
Restart:	150
OK Cancel	

Enabled

This parameter enables (√) or disables the Storm Detection filters.

Threshold

The maximum number of broadcast/multicast frames that should be received in one second is defined in this parameter. When that threshold is exceeded, a broadcast storm is declared. Every broadcast/multicast frame received will be discarded until it is determined that the storm is over (see *Restart*, below). Setting the value for *Threshold* is determined by the characteristics of your network.

The default value is **200**.

Restart

The broadcast storm is determined to be over when the number of broadcast frames received for a one second period is less than or equal to the value entered in this parameter. Setting the value for *Restart* is determined by the characteristics of your network.

The default value is **150**.

4.5 Mobility Configuration

The *Mobility Configuration* page is entered from the *Access Point Configuration* menu on the first page.

Access Point Configuration:	
MAC Bridge Parameters:	Configure
Mobility Configuration:	Configure
Mobile IP Parameters:	Configure

Going to the *Mobility Configuration* page opens the *IAPP Parameters* options.

Teklogix 9150: Mobility Configuration

IAPP Parameters:	
Announce Period: (seconds)	120
Handover Timeout: (milliseconds)	500
Handover Retries:	14
Delay Double:	☑

OK	Cancel

The Inter-Access Point Protocol (IAPP) is an extension to the IEEE 802.11b protocol. In a multiple-9150 system, IAPP facilitates roaming of mobile stations (terminals) among the 9150s, and enables communication and awareness between the 9150s.

Every terminal is associated with one 9150, but it can re-associate with another 9150 to maintain uninterrupted communications. The association is "handed over" from one 9150 to the next. The newly-associated 9150 will receive the terminal's data frames and pass them onto the LAN. Returning frames are no longer accepted by the original 9150, which has disassociated from that terminal. Returning frames are now accepted by the newly-associated 9150 and passed over the RF to the terminal.

To implement these procedures and coordinate the 9150s, IAPP specifies two message types: *Announce* and *Handover*.

In IAPP *Announce* procedures, when the 9150 is initialized, it sends an IP multicast message to inform the other 9150s in the network that it has become active. It also informs the other 9150s of its continued operation ('alive' status) by periodically multicasting the Announce beacon.

The *Handover* protocol is intended to inform the old 9150 that a terminal has been associated with a new 9150, and to update the filter tables of intermediate MAC-bridges to correctly forward frames destined for the terminal. The newly-associated 9150 sends a Handover request to the old 9150, which disassociates itself and acknowledges the request.

> ⚠️ ***Important:*** ***These parameters are set with optimum default values. Do not adjust these values without discussing the effects with your Psion Teklogix representative.***

4.5.1 IAPP Parameters

Announce Period

The *Announce Period* parameter indicates the number of seconds between Announce broadcasts. For further information, see "Mobility Configuration" on page 96.

Handover Timeout

If there is no response to the Handover request by the 9150 within the time specified in the *Handover Timeout* parameter, the request is retransmitted. If no response is received after a number of retries (set in the *Handover Retries* parameter, below), the 9150 will complete the reassociation procedure itself. For further information, see "Mobility Configuration" on page 96.

Handover Retries

This parameter sets the number of times the 9150 will transmit a Handover request to the disassociated 9150, before it completes the association transfer itself. See also *Handover Timeout*, above.

Delay Double

The *Delay Double* parameter doubles the amount of Handover Timeout between Handover Retries. For example, if the first retry is after 500 milliseconds, the next Handover request is sent after 1 second, followed by a retry after 2 seconds, etc.

4.6 Mobile IP Parameters

Mobile IP is used to allow mobile nodes (i.e. terminals) to roam seamlessly between different TCP/IP subnets (10.16.xxx.xxx -> 10.128.xxx.xxx), through foreign and home "agents" (9150s), which act as proxies. When the terminal roams away from its home network, the home agent will take all packets destined for the mobile node, and send them on to the foreign agent, which relays the packets to the "node" (terminal).

Access Point Configuration:	
MAC Bridge Parameters:	Configure
Mobility Configuration:	Configure
Mobile IP Parameters:	Configure

Teklogix 9150: Mobile IP Configuration

Enable Mobile IP:	☐

Mobile Agent Parameters:

Advertisement Lifetime (in seconds):	10
Minimum Advertisement Interval (in seconds):	3
Maximum Advertisement Interval (in seconds):	4

Mobile Node Parameters:

Registration Lifetime (in seconds - 65535 = Infinite):	65535
Maximum Number of Bindings per Mobile Node:	1
Maximum Number of Registered Mobile Nodes [acting as home agent]:	12
Maximum Number of Visiting Mobile Nodes [acting as foreign agent]:	12

Supported Features:

Allow Simultaneous Binding:	☐
Replay Protection [using timestamps]:	☐

Gratuitous ARP configuration:

Delay Between Gratuitous ARPs:	2
Number of Retries:	3

Security Configuration:

Security Parameter Index [SPI]:	999
Security Key [MD5]:	TEKLOGIXTEKLOGI
Replay Protection Timing Slack:	300

OK   Cancel

4.6.1 Mobile IP Configuration

Enable Mobile IP

This parameter enables (√) or disables the Mobile IP feature.

The default is **disabled**.

4.6.1.1 Mobile Agent Parameters

Mobile Agent Parameters:

Advertisement Lifetime (in seconds):	10
Minimum Advertisement Interval (in seconds):	3
Maximum Advertisement Interval (in seconds):	4

Advertisement Lifetime

This parameter is the maximum length of time (in seconds) that the advertisement is considered valid in the absence of further advertisements. If the mobile node does not get an advertisement within this period of time, it will assume it has lost contact with that agent. It will then attempt to register any other agent that it has heard.

The acceptable value ranges from **3** to **30**. The default value is **10**.

Minimum Advertisement Interval

This parameter is the minimum period of time (in seconds) between advertisements. The nominal interval at which the agent advertisements are sent should be 1/3 of the *Advertisement Lifetime* parameter value. This allows the mobile node to miss three successive advertisements before deleting the agent from its list of valid agents.

The acceptable value ranges from **1** to **10**. The default value is **3**.

Maximum Advertisement Interval

This parameter is the maximum period of time (in seconds) between advertisements. The nominal interval at which the agent advertisements are sent should be 1/3 of the *Advertisement Lifetime* parameter value. This allows the mobile node to miss three successive advertisements before deleting the agent from its list of valid agents.

The acceptable value ranges from **1** to **10**. The default value is **4**.

4.6.1.2   Mobile Node Parameters

Mobile Node Parameters:

Registration Lifetime (in seconds - 65535 = Infinite):	65535
Maximum Number of Bindings per Mobile Node:	1
Maximum Number of Registered Mobile Nodes [acting as home agent]:	128
Maximum Number of Visiting Mobile Nodes [acting as foreign agent]:	128

Registration Lifetime

This parameter is the maximum registration lifetime that a terminal will register for, in seconds. This value depends on the dynamics of your system. A few tenths of seconds to a few minutes seem appropriate. The value **65535** is equivalent to "infinite" for the parameter using it. If the terminal requests a value that is larger than the value configured in the Home Agent, the registration will be rejected and the terminal will have to retry with a lower value.

The acceptable value ranges from **300** to **65535**. The default value is **65535**.

Maximum Number Of Bindings Per Mobile Node

This parameter represents the maximum number of simultaneously available agents for each mobile node. It should be set to a reasonable value, according to the maximum number of base stations that can be in the mobile node's range simultaneously. Some margin should be taken since although being short on the number of agents will not prevent the system from working, it is not ideal.

The acceptable value ranges from **1** to **5**. The default value is **1**.

Maximum Number Of Registered Mobile Nodes

This parameter is the maximum number of terminals that can register with this 9150 acting as a home agent.

The acceptable value ranges from **1** to **255**. The default value is **128**.

Maximum Number Of Visiting Mobile Nodes

This parameter is the maximum number of terminals that can communicate to the home agent via this 9150 acting as a foreign agent.

The acceptable value ranges from **1** to **255**. The default value is **128**.

4.6.1.3   Supported Features

Supported Features:

Allow Simultaneous Binding:	☐
Replay Protection [using timestamps]:	☐

Allow Simultaneous Binding

This parameter enables (√) multiple (simultaneous) bindings.

The default value is **disabled**.

Replay Protection

This parameter enables (√) time-stamp based replay protection. The mobile node and home agent values for this parameter must match.

The default value is **disabled**.

4.6.1.4   Gratuitous ARP Configuration

Gratuitous ARP configuration:

Delay Between Gratuitous ARPs:	2
Number of Retries:	3

Delay Between Gratuitous ARPs

This parameter is the delay (in seconds) between gratuitous ARP retransmissions.

The acceptable value ranges from **1** to **5**. The default value is **2**.

Number of Retries

This parameter is the maximum number of sent gratuitous ARPs on the home network, when the home agent accepts a registration from a mobile node.

The acceptable value ranges from **1** to **5**. The default value is **3**.

4.6.1.5   Security Configuration

Security Configuration:		
Security Parameter Index [SPI]:		`333`
Security Key [MD5]:		`TEKLOGIXTEKLOGI`
Replay Protection Timing Slack:		`300`
OK	Cancel	

Security Parameter Index (SPI)

This parameter is the Security Parameter Index (SPI) of association with the home agent. The SPI value must match the SPI value on the mobile node.

The minimum acceptable value is **256**. The default value is **333**.

Security Key (MD5)

The Security Key parameter is in ASCII text with a maximum length of 16 bytes. The agent key must also match the key on the mobile node.

The default value is **TEKLOGIXTEKLOGIX**.

Replay Protection Timing Slack

This parameter provides Timestamp-based replay protection.

⚠ *Important: In order for this parameter to operate, SNTP must also be enabled (see "SNTP" on page 49).*

4.7 802.1X Authenticator Parameters

Teklogix 9150: 802.1X Authenticator Parameters

802.1X General Parameters:

Enabled: ☐

RADIUS General Parameters:

Deadline: 1 Minutes

Timeout: 30 Seconds

Retries: 5

RADIUS Servers:

Number:	IP Address:	Server Key:
1	0.0.0.0	
2	0.0.0.0	
3	0.0.0.0	

OK Cancel

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4.7.1 802.1X General Parameters

Enabled

This parameter enables (√) the 802.1X authenticator.

4.7.2 RADIUS General Parameters

These parameters apply to the RADIUS authentication server.

Deadline

If the authenticator considers a RADIUS authentication server to be unreachable (in other words, the server has not replied after all of the authentication requests allowed by the *Retries* parameter), the authenticator won't try to connect to the same

server during this period. (This duration is given in minutes.) Subsequent authentication requests are immediately sent to the next authentication server in the 9150's list. See also the *Timeout* and *Deadline* parameters.

Timeout

This parameter sets the maximum amount of time (in seconds) that the 9150's authenticator waits for the authentication server to reply after it sends an authentication request. See also the *Deadline* and *Retries* parameters.

Retries

This parameter sets the total number of times (including the first time) that the 9150 will send an authentication request to the authentication server. See also the *Timeout* and *Deadline* parameters.

4.7.3 RADIUS Servers

This part of the screen lists the authentication servers in the order by which they will be contacted for authentication. If server 1 is not contactable, the 9150 will attempt to contact sever 2, and so on. This is governed by the *Deadline*, *Timeout*, and *Retries* parameters.

IP Address

This is the IP address of the authentication server.

Server Key

The server key functions like a password; the authenticator provides it to the authentication server. The authentication server must have a matching key for this specific access point. The key is an ASCII string.

BASE STATION CONFIGURATION 5

5.1 Overview

The 9150 Wireless Gateway can function as either a wired or wireless Base Station, or as a Remote Radio Module (RRM), using a radio link and Psion Teklogix proprietary protocols to facilitate communications with the terminals (see also "Radio Protocols" on page 7).

As a wired base station, the 9150 can communicate with both wireless base stations and terminals using either Adaptive Polling/Contention or Wlan Protocols (see page 13), and is connected to the network controller over a network.

As a wireless base station, the 9150 communicates with the wired base station and mobile terminals using the Wlan Protocol.

As an RRM, the operation and timing of the 9150's radio link to the terminals is directly controlled by a network controller that uses a timeplexing radio protocol (see "Timeplexing And Cellular Switching", below). It is connected to the network controller over a network.

Timeplexing And Cellular Switching

There are two methods of operating on the radio link. The first method is called *cellular switching*. It is similar in concept to cellular telephone systems. Here, each base station uses a different radio channel. The terminals monitor the radio link and automatically switch to the channel with best radio reception. This cellular switching capability is transparent to the host.

The second method is called *timeplexing*. Here, all Remote Radio Module (RRM) bases at the site use the same channel. Over a UDP/IP network, a network controller, or the 9150 as a mini-controller, coordinates the polling sequence so that the RRMs do not transmit simultaneously. This timeplexing capability is also transparent to the host. Timeplexing is suited for sites with low transaction rates.

Cellular switching and timeplexing can be combined within one Teklogix system: a site may operate on two or more channels, with several grouped timeplexed bases using each channel, and cellular switching between the channels.

In all of these cases, the operator may move freely throughout the site without loss of communication. The Teklogix system handles channel-switching and handovers between bases without alerting the user.
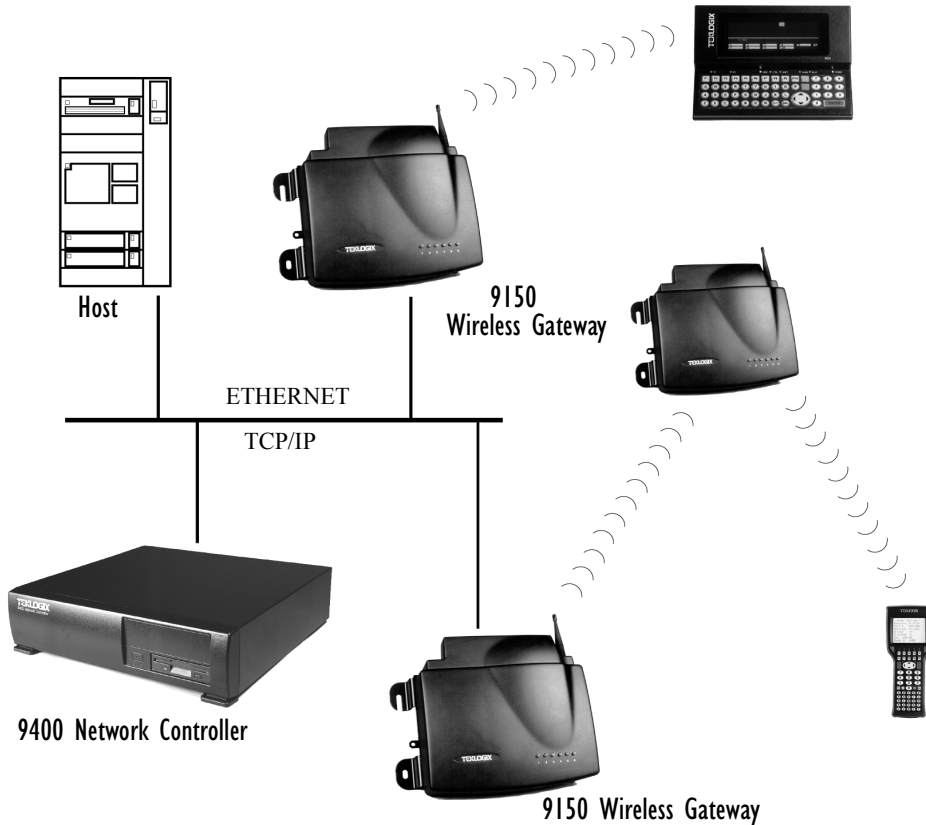
Figure 5.1 9150 Base Station/RRM Configuration

For operation as a base station or RRM, the parameters in the *Base Station Configuration* pages on the *Configuration Main Menu* screen should be set appropriately, as described in the sections that follow. In addition, the appropriate radio and host parameters must be applied. The radio parameters are found in the *Interfaces* pages for *TekLAN* and *Narrow Band* radios. See pages 110 and 114, respectively. The host parameters are found in the *Mini-Controller Configuration: Hosts* pages, which can be found starting on page 140. See Figure 5.2 on page 109 for an overview of the menus involved.

Note: *The 9150 main parameters should first be set up as described in Chapter 3: "9150 Main Configuration". For details on the RF protocols, see page 13.*
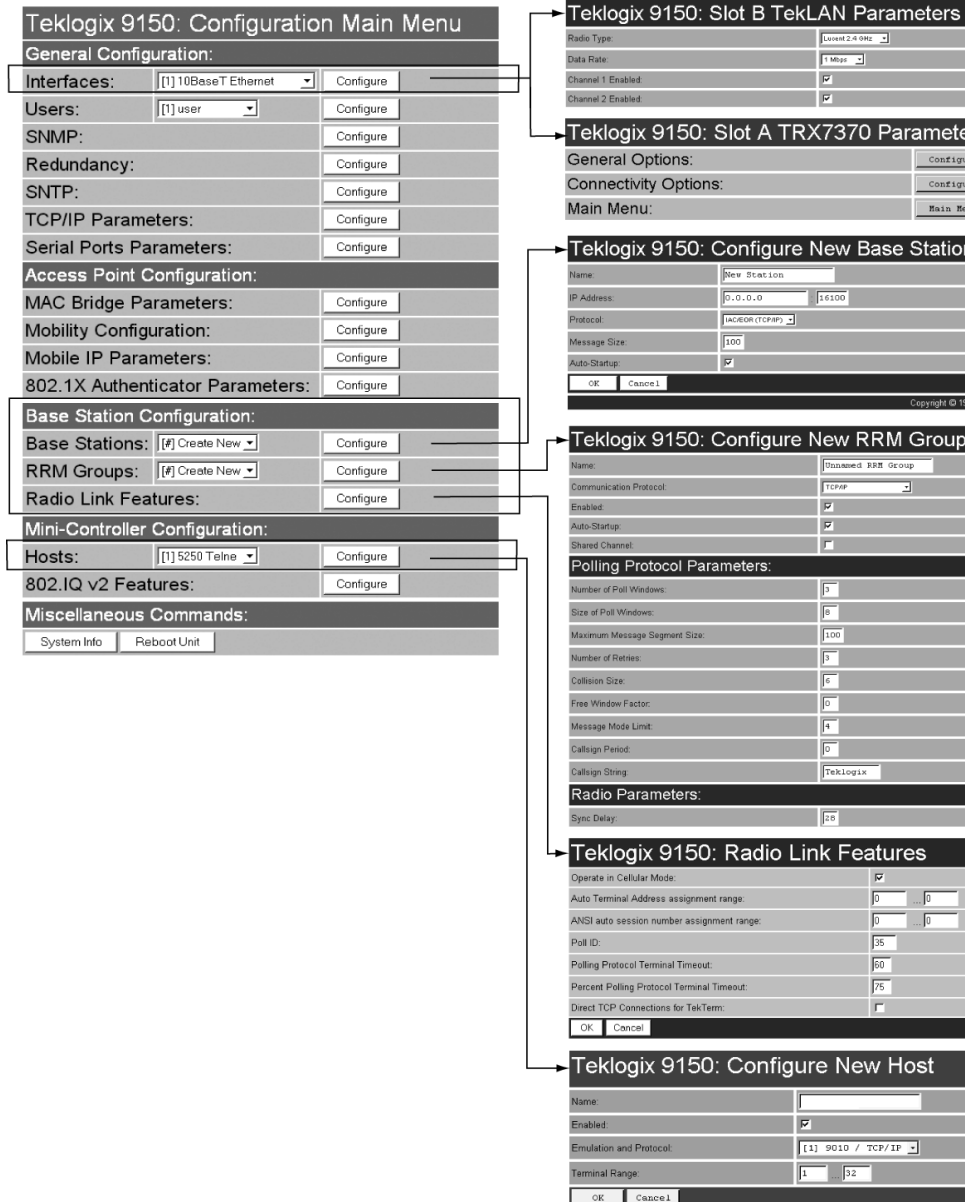
Figure 5.2 Overview Of Menus For Base Station Configuration

5.2 General Configuration Menu: Interfaces
5.2.1 TekLAN Parameters

The pull-down menu shown for the *Interfaces* option in the 9150 *Configuration Main Menu* page indicates which interfaces have been detected in use. Entering the "Configure" dialog box for "Slot A: TekLAN Card", opens the parameters page for TekLAN, which presents both the radio and Wlan parameters.

Figure 5.3 Overview Of TekLAN Menus

5.2.1.1   Radio

Teklogix 9150: Slot B TekLAN Parameters	
Radio Type:	Lucent .4 GHz
Data Rate:	122 Kbps
Channel 1 Enabled:	☑
Channel 2 Enabled:	☑
Channel 3 Enabled:	☑
Channel 4 Enabled:	☑
Channel 5 Enabled:	☑
Channel 6 Enabled:	☑
Channel 7 Enabled:	☑
Active Channel:	1
Range:	2412-2462 MHz
Enable Card:	☑
Auto Startup:	☑

Radio Type

The type of PC radio card installed on the 9150 is dependent on your wireless net-work. This parameter should be set to the installed radio. The TekLAN radio is the TekLAN 902 MHz DS Spread Spectrum.

⚠️ *Important:*   ***If changing radio types in the 9150, DO NOT "hot swap" the PC cards: turn the 9150 off before changing the radio. Following this, when changing the* Radio Type *parameter, the unit must be powered OFF and ON again ("cold" rebooted). Rebooting with the* Reboot Unit *option will not implement the radio parameter change.***

Data Rate

This parameter determines the data rate (bit rate) for the radio channel. This is a decimal value in bits per second. The acceptable value for the *Data Rate* parameter for the TekLAN 902 MHz DS SS is **122kb/s**.

Channel n Enabled

These parameters are used to **enable** (√) or **disable** a channel. The number of channels available is determined by the type of radio installed. See "PC Card Radios" on page 214 for the number of available channels for each radio type.

Active Channel

This parameter determines the current default radio channel.

Range

The federal agencies, Industry Canada and the Federal Communications Commission in the United States, as well as other country-specific agencies world-wide, regulate the use of radio frequencies to ensure that communication conflicts are avoided. See "PC Card Radios" on page 214 for the assigned frequencies for each radio type.

The *Range* parameter determines which channels can be enabled and is set according to the approved frequency range in the country where the system is installed. The TekLAN 902 MHz radio is only assigned the 902 MHz frequency.

Enable Card

This parameter **enables** the PC card (√). The card may be **disabled** temporarily when, for testing purposes, it is required that there be no radio interference.

Auto-Startup

This parameter **enables** (√) polling immediately when the 9150 is rebooted. If *Auto-Startup* is **disabled**, the 9150 will wait until polling is initialized from the network controller. When the 9150 is operating as a Wlan base station under a network controller, this parameter should be **disabled**.

5.2.1.2   Wireless LAN Parameters

The Wlan protocol can only be used with spread spectrum radios.

Wireless LAN Parameters	
Base Number:	1
Wired Network Connection:	☑
Timeout:	10
Max Priority:	20
Base Priority:	2
Message Duration:	15
Offline Timeout:	0
OK Cancel	

⚠ *Important: If your system is using the Wlan protocol, make sure that* **Operate in Cellular Mode** *is enabled (see page 136) in the Radio Link Features sub-menu and that cellular mode is also set on the 9400/ Network Controller.*

Base Number

This parameter is used to assign a unique address to each base station. As the terminals move from one base station to another, this address is transmitted by the base stations to the terminals, identifying each 9150 on a multiple base station system. The allowable range of base station numbers is **1** to **64**.

Wired Network Connection

This parameter should be **enabled** (√) if the 9150 is directly connected (wired) to the network. If the 9150 is a wireless base station, this parameter should be **disabled**.

The default setting is **enabled**.

Timeout

This value is used to adjust Wlan performance and should be set to **10**.

Max Priority

This value is used to adjust Wlan performance and should be set to **20**.

Base Priority

The *Base Priority* parameter determines the number of priority transmit slots reserved for each base station. The allowable range for this parameter is **0** to **100**. For optimal performance, this parameter should be set to a value of **2**.

Message Duration

This parameter controls the duration of transmit slots to optimize communications and decrease the likelihood of collisions. A *Message Duration* value of **1** translates into a slot duration of 130 micro seconds. The allowable range for this parameter is **2** to **200**. For optimal performance, this parameter should be set to **15**.

Offline Timeout

This parameter determines the time in minutes that a terminal is allowed to be inactive before the 9150 declares it offline. An offline terminal is still considered part of the system. Messages to offline terminals are queued at the 9150. The terminal remains offline until it transmits any message. Values for this parameter range from **0** to **100**. If the parameter is set to **0**, terminals are never declared offline.

5.2.2 Narrow Band Radio Parameters

The pull-down menu shown for the *Interfaces* option on the 9150 *Configuration Main Menu* page indicates which interfaces have been detected in use. For the selection "Slot A: Teklogix Narrowband", entering the "Configure" dialog box will display the *Slot A TRX7370 Parameters* menu for the TRX7370 Narrow Band PC card radio, as shown in Figure 5.4 on page 115. The *Slot A TRX7370 Parameters* menu has two configuration sub-menus:

"General Options"
When you select this sub-menu, the page displayed allows you to set the operating options for the 9150 in either base station or RRM mode, and to retrieve the radio card's permanent communications settings.

"Connectivity Options"
When you select this sub-menu, the 9150 displays the Parameters page of the operating mode for which the 9150 is set (base station or RRM).

There is also a *Main Menu* button. When you select this button, the 9150 displays the *Configuration Main Menu (see page 109)*.

Figure 5.4 Overview Of Teklogix Narrow Band Menus

5.2.2.1   General Options

```
Teklogix 9150: Slot A TRX7370 Parameters
```
```
Enable Card:          ☑
Operating Mode:       RRM          ▾
                      Base Station
   OK         Cance   RRM
```
```
TRX7370 Radio Card Parameters:
     Get Card Parameters
```

When you select this sub-menu, the page displayed allows you to set the operating options for the 9150, and to retrieve the TRX7370 radio card's permanent communications settings.

Enable Card

This parameter **enables** the PC card (√). The card may be **disabled** temporarily when, for testing purposes, it is required that there be no radio interference.

⚠ *Important: If changing radio types in the 9150, DO NOT "hot swap" the PC cards: turn the 9150 off before changing the radio.*

Operating Mode

This parameter allows you to set the operating mode of the 9150 as **Base Station** or **RRM**.

5.2.2.2   TRX7370 Radio Card Parameters

```
TRX7370 Radio Card Parameters:
     Get Card Parameters
```

Entering the "Get Card Parameters" dialog box will open the list of *General*, *Frequencies*, and *Tuning Values* parameters for the TRX7370 Narrow Band PC card radio. These manufacturer's settings are not configurable. The settings are shown on pages 118 and 119.

Teklogix 9150: Slot A TRX7370 Radio Card Parameters

General Parameters:

Modulation:	2 Level
Baud Rate:	9600
Band Start:	450MHz
Band Size:	16MHz
Frequency Step:	6250Hz
Power:	2W, full power
Collision Threshold:	30ms
Preamble, 2 Level:	10DEL, 1SOH chars
Preamble, 4 Level:	6DEL, 1SOH chars

`OK`

Frequencies:

Channel	Rx	Tx
1.	462250000Hz	462250000Hz
2.	462000000Hz	462000000Hz
3.	452250000Hz	452250000Hz
4.	466000000Hz	466000000Hz
5.	453250000Hz	453250000Hz
6.	453750000Hz	453750000Hz
7.	454250000Hz	454250000Hz
8.	454750000Hz	454750000Hz
9.	455250000Hz	455250000Hz
10.	455750000Hz	455750000Hz
11.	456250000Hz	456250000Hz
12.	456750000Hz	456750000Hz
13.	457250000Hz	457250000Hz
14.	457750000Hz	457750000Hz
15.	458250000Hz	458250000Hz
16.	458750000Hz	458750000Hz
17.	459250000Hz	459250000Hz
18.	459750000Hz	459750000Hz
19.	460250000Hz	460250000Hz
20.	460750000Hz	460750000Hz

Tuning Values:

Data Squelch:	20480
Frequency Adjust:	0
Deviation, 2 Level:	11264
Deviation, 4 Level, Subband 1:	14704
Deviation, 4 Level, Subband 2:	14704
Deviation, 4 Level, Subband 3:	14704
Deviation, 4 Level, Subband 4:	14704
Deviation, 4 Level, Subband 5:	14704
Modulation Balance, Subband 1:	1414
Modulation Balance, Subband 2:	1414
Modulation Balance, Subband 3:	1414
Modulation Balance, Subband 4:	1414
Modulation Balance, Subband 5:	1414

General Parameters

General Parameters:	
Modulation:	2 Level
Baud Rate:	9600
Band Start:	450MHz
Band Size:	16MHz
Frequency Step:	6250Hz
Power:	2W, full power
Collision Threshold:	30ms
Preamble, 2 Level:	10DEL, 1SOH chars
Preamble, 4 Level:	6DEL, 1SOH chars

OK

Frequencies

Frequencies:		
Channel	Rx	Tx
1.	462250000Hz	462250000Hz
2.	462000000Hz	462000000Hz
3.	452250000Hz	452250000Hz
4.	466000000Hz	466000000Hz
5.	453250000Hz	453250000Hz
6.	453750000Hz	453750000Hz
7.	454250000Hz	454250000Hz
8.	454750000Hz	454750000Hz
9.	455250000Hz	455250000Hz
10.	455750000Hz	455750000Hz
11.	456250000Hz	456250000Hz
12.	456750000Hz	456750000Hz
13.	457250000Hz	457250000Hz
14.	457750000Hz	457750000Hz
15.	458250000Hz	458250000Hz
16.	458750000Hz	458750000Hz
17.	459250000Hz	459250000Hz
18.	459750000Hz	459750000Hz
19.	460250000Hz	460250000Hz
20.	460750000Hz	460750000Hz

Tuning Values

Tuning Values:	
Data Squelch:	20480
Frequency Adjust:	0
Deviation, 2 Level:	11264
Deviation, 4 Level, Subband 1:	14704
Deviation, 4 Level, Subband 2:	14704
Deviation, 4 Level, Subband 3:	14704
Deviation, 4 Level, Subband 4:	14704
Deviation, 4 Level, Subband 5:	14704
Modulation Balance, Subband 1:	1414
Modulation Balance, Subband 2:	1414
Modulation Balance, Subband 3:	1414
Modulation Balance, Subband 4:	1414
Modulation Balance, Subband 5:	1414

5.2.2.3   Connectivity Options: Base Station Mode

When you enter the *Connectivity Options* sub-menu for the 9150 set in base station operating mode, the 9150 displays the Polling Protocol Parameters and Radio Parameters.

Teklogix 9150: Slot A TRX7370 Parameters

General Options:	Configure
Connectivity Options:	Configure
Main Menu:	Main Menu

Teklogix 9150: Slot A TRX7370 Parameters

Auto-Startup:	☑
Shared Channel:	☐

Polling Protocol Parameters:

Number of Poll Windows:	3
Size of Poll Windows:	8
Maximum Message Segment Size:	100
Number of Retries:	3
Collision Size:	6
Free Window Factor:	0
Message Mode Limit:	4
Callsign Period:	0
Callsign String:	Teklogix

Radio Parameters:

Sync Delay:	22
Remote Txon:	13
Active Channel:	1

OK	Cancel

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Auto-Startup

This parameter **enables** (√) polling immediately when the 9150 is rebooted.
If *Auto-Startup* is **disabled**, the 9150 will wait until polling is initialized from the
network controller.

Shared Channel

Shared Channel is only used in Holland to accommodate government requirements.
When **enabled** (√), it imposes timing restrictions for polling. Every 2 seconds of
polling is followed by 0.5 seconds of silence—no polling occurs.

Further, if another carrier is detected on the channel, the 9150 will cease radio trans-
missions on that channel until the path is clear.

POLLING PROTOCOL PARAMETERS

Polling Protocol Parameters:	
Number of Poll Windows:	3
Size of Poll Windows:	8
Maximum Message Segment Size:	100
Number of Retries:	3
Collision Size:	6
Free Window Factor:	0
Message Mode Limit:	4
Callsign Period:	0
Callsign String:	Teklogix

Number of Poll Windows

This parameter defines the number of poll windows the 9150 will use. The value
assigned to this parameter is dependent on the number of terminals and the radio
link protocol used.

Table 5.1 on page 122 indicates how the value assigned to the *Number of Poll
Windows* parameter is determined.

Number of Terminals	Minimum # of Windows
1-16	2
17-81	3
82-256	4

Table 5.1 Number Of Poll Windows – Cellular Protocol

Size of Poll Windows

The value assigned to this parameter determines the largest message that can be passed between the 9150 and the terminal in a normal poll window. The window size can be adjusted to accommodate anywhere from **4** to **32** characters.

Larger windows increase the polling period and can increase the response time. Smaller windows increase the number of message and long message polls, and can also increase the response time.

Important: In "Cellular" mode, the minimum value for this parameter is 8.

Maximum Message Segment Size

This parameter determines the largest single message that can be passed *to* a terminal in message mode or *from* a terminal in long message mode. In a 9150 base station, the value entered in this parameter must be greater than or equal to the value entered in the network controller or 9150 mini-controller. The range of this parameter is between 32 and 116 characters. (Longer messages are broken into several packets.) The default value is **100**.

Number of Retries

This parameter determines how many times the 9150 attempts to resend a message if an acknowledgement is not received from the terminal. (These retries do not necessarily occur in consecutive polls because incomplete messages are returned to the bottom of the message queue.) After all retries have been exhausted, the terminal is declared "offline". The 9150 does not transmit any messages to the terminal until the terminal declares itself "online". The allowable values range from **1** to **7**.

Collision Size

This parameter reduces the probability that random noise on the radio link will be interpreted as a collision between terminals. Response time increases when the 9150 resolves collisions unnecessarily.

Collision Size places an upper limit on the number of characters that are received prior to the receipt of an error message (CRC, CD lost, etc.). If eight is the value of this parameter, eight or less characters followed by an error message appearing over the radio link are considered noise. If there are more than eight characters, it is considered a collision. Acceptable values range from **3** to **15**.

Free Window Factor

The value entered in this parameter determines if "free window mode" will be used. In free window mode, all terminals that are not assigned any other window can use the free window.

Entering a value of **0** (zero) in this parameter **disables** free window mode. Increasing the value of this parameter increases the likelihood of a message being transmitted in the free window.

Message Mode Limit

This parameter defines an upper limit to the number of messages that must be queued for transmission before message mode polling starts. Accepted values range from **0** to **7**, where **0 disables** message mode.

Note: The number of terminals and past events are also part of the algorithm that determines whether or not to start message mode.

Callsign Period

A call sign is periodically transmitted as an audible Morse code signal. This parameter specifies the interval in minutes between call sign transmissions. Acceptable values range from **0** to **60**. The federal agencies, Industry Canada and the Federal Communications Commission in the United States, require that each system transmit its own identification call sign every 15 minutes.

In countries where a call sign is not required, setting this parameter to **0** prevents the transmission of any call signs, allowing for shorter poll time-outs in terminals and faster channel switching.

Callsign String

This string can be a maximum of **10** characters long. All characters are either numbers or letters. The prefix "DE" (from) is added to the beginning of the transmitted call sign.

RADIO PARAMETERS

Radio Parameters:	
Sync Delay:	22
Remote Txon:	13
Active Channel:	1

OK	Cancel

Sync Delay

Important: ***This parameter should not be changed from its factory setting without a clear understanding of the timing of the radio protocol.***

Sync Delay specifies the delay between the time of the base station transmission and the first response window, measured in character times. The value assigned to this parameter must be compatible with other base stations and terminals in the system. The TRX7370 radio is available in either two level or four level modulation, providing baud rates of 4800 bps and 9600 bps, or 9600 bps and 19200 bps, respectively.

The default setting for a two level modulation narrow band radio, operating at 9600 baud, is **23**.

The default setting for a four level modulation narrow band radio, operating at 19200 baud, is **31**.

Remote Txon

Remote Txon accommodates the turn on time of the radio in terminals (remotes). It specifies the number of fill characters sent to the radio before real data is output. Since this parameter is based on character times, the number is dependent on the radio link baud rate.

The value assigned to the *Remote Txon* parameter must be consistent across all terminals and base station equipment. The allowable value range is **3** to **60**.

⚠ *Important:* ***This parameter should not be changed from its factory setting without an understanding of the timing of the radio protocol.***

Active Channel

This parameter determines the operating radio channel of the 9150. This makes the channel available for channel searching by the terminals. The channel selected must be one of those that have been configured with frequencies, as indicated on the TRX7370 Radio Card Parameters page. See page 118 for the list of associated channels and frequencies.

5.2.2.4   Connectivity Options: RRM Mode

When you enter the *Connectivity Options* sub-menu for the 9150 set in RRM operating mode, the 9150 displays the RRM parameters.

Teklogix 9150: Slot A TRX7370 Parameters	
General Options:	Configure
Connectivity Options:	Configure
Main Menu:	Main Menu

Teklogix 9150: Slot A TRX7370 Parameters	
Port:	16132
OK Cancel	

Port

This parameter allows you to enter the port number of the 9150. The port number can range from **1024** to **32767**.

⚠ *Important:* ***The port number entered here must match the port number entered for this 9150 in the network controller's RRM configuration.***

5.3 Base Station Configuration Menu Options

The 9150 Wireless Gateway can operate as a base station or remote radio module (RRM), facilitating the communications between terminals and wireless base stations and a network controller (Teklogix 9400 Network Controller or 9150 Wireless Gateway), using a range of host platforms. Alternatively, the network controller can be a host running a Teklogix SDK (handler). The 9150 can also act as a slave base station to another 9150 on the network.

5.3.1 Base Stations

Base stations communicate over the radio link using Psion Teklogix proprietary protocols. They can optionally carry IP data over these protocols. Base stations can be connected to network controllers using TCP/IP over Ethernet networks. As a base station communicating with terminals through a radio link, the 9150 uses the Wireless LAN (Wlan) or Adaptive Polling/Contention RF protocols (see page 7 for details on the protocols). The 9150 controls the radio link's operation and timing. Each base station uses a different radio channel, and terminals use cellular switching to roam between stations.

The options and parameters on the following pages allow you to configure the 9150 as a master base station connected to up to 32 slave 9150 base stations over an Ethernet network. The master 9150 is connected to a 9400 Network Controller, or up to six hosts running TSDK (Teklogix Software Development Kit). From the *Base Stations* option under *Base Station Configuration* (see Figure 5.2 on page 109), entering "Configure" will open the "Configure New Base Station" page, which will enable you to add a new slave base station to the system or change the parameters on an existing slave base station.

Teklogix 9150: Configure New Base Station

Name:	New Station
IP Address:	0.0.0.0 : 16100
Protocol:	IAC/EOR (TCP/IP)
Message Size:	100
Auto-Startup:	☑

OK   Cancel

Name

The name entered in this parameter is used as an alternate way of identifying the IP address of a slave base station.

IP Address

This parameter provides the corresponding IP address for the slave base station. The *IP Address* **must be a unique value** so that each slave base station can be identified on the network.

The acceptable value ranges from **0.0.0.0** to **239.255.255.255**.

The default value for the IP port is **16100**.

Protocol

IAC/EOR (TCP/IP) is the default protocol for the Ethernet connection.

Message Size

Message Size determines the largest single message that can be passed to a terminal. The range of this parameter is between **32** and **380** characters. (Longer messages are broken into several packets.)

For polling protocol base stations, the upper limit is **116**.

Auto-Startup

When this parameter is **enabled** (√), the slave base stations will start polling when the **master 9150** boots up. When *Auto-Startup* is **disabled**, the base stations will not start polling until they receive a *start polling* command from the **host**.

5.3.2 RRM Groups

While the 9150 can operate as a Remote Radio Module (RRM, see "Connectivity Options: RRM Mode" on page 125), it can also control other RRMs. For a 9150 to control RRMs, RRM groups must be configured. Once an RRM group has been defined, from one to four RRMs can be members of a group (see "RRM Group Menu" on page 134).

All RRMs in a group operate on the same radio channel. The 9150 coordinates the transmissions of all the RRMs in a group (for this reason, the controlling 9150 is sometimes referred to as the "Timeplexing Master").

5.3.2.1 Configure New RRM Group

In this screen, shown on the next page, the user can set options for a new RRM group. Each RRM must be a member of an RRM group; there may be more than one RRM group configured in the 9150. An RRM group may contain from one to four RRMs.

This screen is very similar to the one in "Connectivity Options: Base Station Mode" on page 120, the difference being that the parameters configured in those radio menus apply to the TRX7370 radio resident in the 9150, while the parameters configured here apply to the other, remote 9150s (the RRMs).

Teklogix 9150: Configure New RRM Group

Name:	Unnamed RRM Group
Communication Protocol:	TCP/IP
Enabled:	☑
Auto-Startup:	☑
Shared Channel:	☐

Polling Protocol Parameters:

Number of Poll Windows:	3
Size of Poll Windows:	8
Maximum Message Segment Size:	100
Number of Retries:	3
Collision Size:	6
Free Window Factor:	0
Message Mode Limit:	4
Callsign Period:	0
Callsign String:	Teklogix

Radio Parameters:

Sync Delay:	28
Remote Txon:	13
Active Channel:	1

Group Parameters:

Combination 1:	
Combination 2:	

OK	Cancel	Delete

Name

This textbox allows the user to enter a name for the new RRM group. The value is any text string. The default is **Unnamed RRM Group**.

Communication Protocol

This listbox allows you to select the protocol to be used for the connection to this RRM group. The default is the **TCP/IP** protocol.

Enabled

The *Enabled* option must be turned on (√) for the 9150 to function as an RRM group controller. If this option is **disabled**, the 9150 automatically goes into base station mode.

Auto-Startup

When this parameter is **enabled** (√), the 9150 establishes communication with the RRMs in this RRM group when it boots, and starts polling automatically.

When *Auto-Startup* is **disabled**, the 9150 establishes communication with the RRMs in this group when it boots, but does not start polling in this RRM group until a start polling command is received from the host.

Polling starts if at least one of the RRMs in the RRM group is operating when the 9150 boots.

Shared Channel

If this parameter is **enabled** (√), the 9150 checks for other traffic on the radio channel used by this RRM group, before polling.

If this parameter is **disabled**, the 9150 assumes that it has exclusive use of the radio channel for this RRM group, and polls without checking for radio traffic.

This parameter is required for systems installed in the Netherlands.

POLLING PROTOCOL PARAMETERS

Warning: ***These parameters are pre-configured for your system, and should
not be changed without a proper understanding of how they affect
the radio link.***

Number of Poll Windows

This textbox allows the user to specify the number of poll windows in which the RRM listens for terminal responses after sending a poll. The allowable values range from **2 to 4**. The default value is **3**.

Size of Poll Windows

This textbox allows the user to specify the size of the poll windows in which the RRMs of this RRM group listen for terminal replies. The allowable values range from **5 to 32**. The default value is **8**.

Maximum Message Segment Size

This textbox allows the user to specify the size of the largest message segment, in bytes, that will be sent over the Teklogix radio network. Larger messages are broken into parts. The allowable values range from **32 to 116**. The default value is **100**.

Number of Retries

This textbox allows the user to specify the number of times the RRM retransmits a message to a terminal, after receiving no acknowledgement from the terminal, before it declares the terminal offline. The allowable values range from **1 to 7**. The default value is **3**.

Collision Size

This textbox allows the user to specify the smallest number of characters of noise received by the RRM, that will be interpreted as interfering transmissions from Teklogix equipment. When this threshold is exceeded, the RRM starts collision resolution. The allowable values range from **3 to 10**. The default value is **6**.

Free Window Factor

This textbox allows the user to specify the probability that the RRM will include a free window in its poll, during which any terminal may transmit. The allowable values range from **0 to 7**. The default value is **0**.

Message Mode Limit

This textbox allows the user to specify the probability of including a message-mode poll in its poll transmission. The allowable values range from **3 to 7**. The default value is **4**.

Callsign Period

This textbox allows the user to specify the amount of time between transmissions of the callsign. This parameter is in minutes. A value of 0 (zero) indicates that no callsign is transmitted. The allowable values range from **0 to 60**. The default value is **0**.

Callsign String

This textbox allows the user to specify the text to be transmitted as the RRM's callsign. The text is transmitted as Morse code. The default value is **Teklogix**.

RADIO PARAMETERS

Because some of the radio parameters are identical for a given group of timeplexed RRMs, they may be configured by the user once on the 9150; the 9150 then passes them to the RRMs in the group. These parameters include the synchronization delay (*Sync Delay*), the remote transmit on-time (*Remote Txon*), and the channel number to be used (*Active Channel*).

Although the TRX7370 narrow band radio in each RRM in the group is configured separately, the 9150 assumes they will be configured identically. To ensure this, the 9150 looks at certain parameters returned by each of the RRMs. These parameters include the radio baud rate and the transmit-on time.

These parameters are compared against the values returned by other RRMs within the same group. Error messages are displayed should these values not match, but the worst case value is chosen for use.

Warning: ***These parameters are pre-configured for your system, and should not be changed without a proper understanding of how they affect the radio link.***

Sync Delay

This textbox allows the user to specify the number of delay characters inserted between the RRM's transmission and the first response window. The allowable values range from **3 to 45**. The default value is **28**.

Remote Txon

This textbox allows the user to specify the number of fill characters sent by the terminal radios before the terminals send message data. The allowable values range from **3 to 32**. The default value is **13**.

Active Channel

This textbox allows the user to specify the radio channel to be used by all the RRMs in the RRM group. The allowable values range from **1 to 20**. The default value is **1**.

GROUP PARAMETERS

Combination

These textboxes allow the user to specify RRM subgroups called *combinations*.

If the coverage areas of two or more of the RRMs in this RRM group do not overlap, the non-overlapping RRMs may poll at the same time. This improves system response time and reduces the amount of signalling on the network.

As an example, if the RRM group has 3 RRMs, and RRMs 1 and 3 don't overlap, RRMs 1 and 3 may be placed in one subgroup (*Combination 1*). They will then poll simultaneously. RRM 2 may be placed in another subgroup (*Combination 2*). Polling alternates between the two subgroups.

To configure a combination, place the numbers of the RRMs in the textbox for that combination. The numbers correspond to the numbers of the RRMs named in the RRM list on the *RRM Group Menu* (see page 134). For instance, "13" in the textbox for *Combination 1* places RRMs 1 and 3 in that subgroup.

Note: When configuring RRM combinations, make sure the configured RRMs are sequential, and are not missing numbers, which can happen when RRMs are deleted and added. The combinations use the RRMs in the order that they appear in the list, not how they are numbered in the list.

RRMs that are not assigned to combinations poll individually, after the combinations poll.

5.3.2.2 RRM Group Menu


```
Teklogix 9150: RRM Group Menu
[Unnamed RRM Group]
General Options:                                    Configure
RRMs:                          [#] Create New ▼     Configure
Main Menu:                                          Main Menu
```

When the user chooses an existing RRM group from the *RRM Groups* listbox in the *Configuration Main Menu* page, pressing the *Configure* button displays the *RRM Group Menu*.

The *RRM Group Menu* has two sub-menus:

General Options
> When the user presses this *Configure* button, the 9150 displays the *Configure Existing RRM Group* screen.

RRMs
> When the user selects the name of an existing RRM from the listbox, then presses this Configure button, the 9150 displays the RRM Options screen for that RRM.

There is also a selection in the listbox, *Create New,* for adding a new RRM.

The *RRM Group Menu* also has a *Main Menu* button to return to the *Configuration Main Menu* page.

GENERAL OPTIONS: CONFIGURE RRM GROUP

Teklogix 9150: Configure RRM Group [Unnamed RRM Group]

Name:	Unnamed RRM Group
Communication Protocol:	TCP/IP
Enabled:	☑
Auto-Startup:	☑
Shared Channel:	☐

Polling Protocol Parameters:

Number of Poll Windows:	3
Size of Poll Windows:	8
Maximum Message Segment Size:	100
Number of Retries:	3

In this screen, the user can select general options for this RRM group. The options in this screen are the same as the options in the *Configure New RRM Group* screen (see page 128). The *Delete* button at the bottom of the screen allows you to delete the currently-displayed RRM Group from the RRM Groups list.

Group Parameters:

Combination 1:	
Combination 2:	

OK   Cancel   Delete

When choosing to delete an RRM Group, you will be prompted for confirmation of the deletion, which will give you the opportunity to cancel the action.

5.3.3 Radio Link Features

From the *Radio Link Features* option under *Base Station Configuration* (see Figure 5.2 on page 109), entering "Configure" will open the "Radio Link Features" page for the polling and cellular parameters.

Teklogix 9150: Radio Link Features

Operate in Cellular Mode:	☑
Poll ID:	35
Polling Protocol Terminal Timeout:	60
Percent Polling Protocol Terminal Timeout:	75
Direct TCP Connections for TekTerm:	☐
Expiration period (in days) for Automatic Radio Address and Terminal Number:	2
Automatic Radio Address assignment range:	1024 ... 2048

Automatic Terminal Number assignment

Group:	Range:		Comment:
Group 1 (Default)	0	... 0	
Group 2	0	... 0	
Group 3	0	... 0	
Group 4	0	... 0	
Group 5	0	... 0	

OK   Cancel

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Operate in Cellular Mode

To operate as a Wlan base station, this parameter should be **enabled** (√). For further information see "Wlan Protocol" on page 13.

Note: The 9400 Network Controller must also be set to cellular mode.

Poll ID

In Wlan protocol, this is a unique identifying number set only in a 9150 master base station, 9150 mini-controller or a network controller, which is used in the poll header when polling terminals. *Poll ID* is set by Psion Teklogix personnel.

In Adaptive Polling/Contention protocol for narrow band radios, *Poll ID* is used to assign a unique address to each base station. As the terminals move from one base station to another, this address is transmitted by the base stations to the terminals, identifying each 9150 in a multiple base station system.

Polling Protocol Terminal Timeout

This parameter determines the time in minutes that a terminal can be inactive before the 9150 declares it offline. Before this happens, the terminal will be declared offline by the *Percent Polling Protocol Terminal Timeout* parameter (see below).

After the terminal is removed from the system, it will need to re-initialize in order to communicate with the 9150. This parameter reduces the overhead on the radio link caused when terminals which are not communicating are supported.

The allowable values range from **1** to **240**.

Note: *This parameter is not relevant for Wlan.*

Percent Polling Protocol Terminal Timeout

This parameter determines the time that a terminal is allowed to be inactive before the 9150 declares it offline. This time is expressed as a percentage of the *Polling Protocol Terminal Timeout* parameter (see above). For example, if the *Polling Protocol Terminal Timeout* is 60, and this parameter is set to 75%, then the timeout would be 60 min x 75% = 45 minutes.

An offline terminal is still considered part of the system. Messages to offline terminals are queued at the 9150. The terminal remains offline until it transmits an online message.

Values for this parameter range from **50** to **90**.

Direct TCP Connections for TekTerm

Enabling this parameter allows the *TekTerm* program resident in Teklogix terminals to connect directly to the 9150, when it is acting as a base station to a host via TCP/IP.

Automatic Radio Address Assignment Range

Each Teklogix terminal using the radio link has a unique radio address number, which can be assigned automatically by the 9150 by enabling this parameter. Currently this feature is only supported through the 802.IQ protocol (for information on 802.IQ configuration, see pages 68 and 201).

To **enable** this parameter, the values for the first and last radio address numbers must lie between **1** and **3840**. The default values for the range are **1024 ... 2084**. To **disable** the parameter, set the values to **0**.

Notes: When enabling this parameter:

> 1. Direct TCP Connections for TekTerm *must be disabled (see page 137).*
>
> 2. *The* Auto ID *parameter in the terminal must be enabled in order for the radio address to be automatically assigned.*
>
> 3. *Do not enable* Auto Startup *(see page 69) on any of the 9150 base stations running 802.IQ with sessions using* Automatic Radio Address Assignment Range *and* Automatic Terminal Number Assignment Range.

Expiration Period...

This parameter dictates how long, in days, a particular radio address or terminal number should be inactive, before the 9150 declares it to be "expired". An expired address or terminal number may be reassigned to another radio or session.

Note: For this feature, it is recommended to enable SNTP and to have an SNTP server available for accurate expiration times.

Automatic Terminal Number Assignment

A terminal number is assigned for every application session created in a terminal. This number helps to uniquely identify all transmissions to and from that session.

Terminal numbers can be assigned automatically to application sessions. The controller also provides a group number for use with TESS and ANSI sessions. Up to five groups of terminal sessions can be defined, and each group can be given a different range of terminal numbers for automatic assignment. These ranges may not overlap between groups.

These groups apply to TESS and ANSI sessions only. In the terminal, TESS or ANSI terminal applications specify which group they belong to, and use the Auto Terminal-Number Assignment range that belongs to that group.

All other session types assume an Auto Terminal-Number Assignment range of 1 to 3840, and do not use the "group" parameter. Non-ANSI and non-TESS emulations that use Auto Terminal-Number Assignment (for example, Remote Sockets) must have their terminal range set starting from 1, and this range must be large enough to accommodate all terminals.

The Radio Link Features screen provides several parameters for each Auto Terminal Number group: a range specified by a lower terminal number and an upper terminal number, and a comment. The comment is a string of ASCII text that can be used to describe the group.

Notes: *When enabling Auto Terminal Number Assignment:*
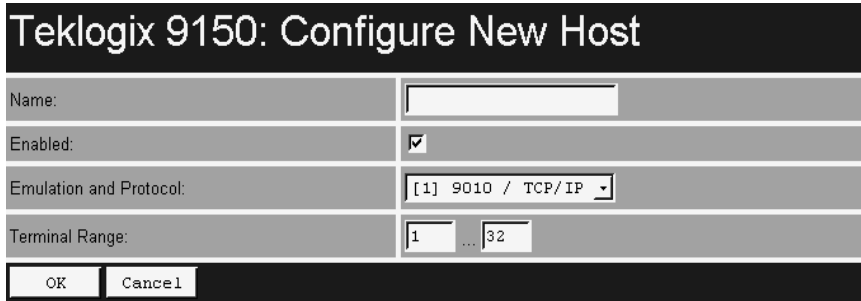
> *1.* Direct TCP Connections for TekTerm *must be disabled (see page 137).*
>
> *2. The* Auto Session *parameter in the terminal must be enabled in order for the terminal session number to be automatically assigned.*
>
> *3. Do not enable* Auto Startup *(see page 69) on any of the 9150 base stations running 802.IQ with sessions using* Automatic Radio Address Assignment Range *and* Automatic Terminal Number Assignment Range.

5.4 Hosts Menu

When the 9150 acts as a base station, it must communicate with a "host" - a 9400 Network Controller, or a host computer using a Teklogix Software Development Kit (TSDK). The drop-down menu in the *Mini-Controller Configuration: Hosts* option in the *Configuration Main Menu* page shows the host names present on the system. Up to six hosts can be supported. A "host" must be configured for each master network controller, TSDK host, or master base station that communicates with the 9150.

Opening the "Configure" dialog box for a selected host lists the parameters that can be modified or deleted for that host. New hosts can be added by selecting "[#] Create New" in the drop-down menu before entering the "Configure" dialog box.

Teklogix 9150: Configure New Host

Name:	
Enabled:	☑
Emulation and Protocol:	[1] 9010 / TCP/IP ▾
Terminal Range:	1 ... 32

OK Cancel

Name

This parameter indicates the assigned host name. The host name also appears on the RF terminal when switching between hosts in a multiple-host environment.

Note: The name must not contain space characters.

Enabled

The *Enabled* option must be turned on (√) for terminals to communicate with this host.

Emulation and Protocol

Teklogix 9150: Configure New Host

Name:	
Enabled:	☑
Emulation and Protocol:	[1] 9010 / TCP/IP ▾
Terminal Range:	[1] 9010 / TCP/IP
	[2] 9010 / SERIAL
OK Cancel	[3] 3274 / Telnet
	[4] 5250 / Telnet
	[5] ANSI / Telnet 2001 Psion Teklogix Inc.
	[6] RFModem / Telnet 1998, 1999 Teklogix Inc.

This drop-down menu provides a list of host emulations and communication protocols supported by the 9150. Protocols are the methods by which terminals communicate with host computers over various physical media such as Ethernet and radio-link connections.

The supported emulations with their respective protocols are:

- 9010/ TCP/IP (See page 144 for configuration parameters).

- 3274/Telnet (See pages 158 to 173 for Configuration Parameters).

- 5250/Telnet (See pages 174 to 188 for Configuration Parameters).

- ANSI/Telnet (See pages 189 to 199 for Configuration Parameters).

- RF Modem (See page 200 for Configuration Parameters).

When the 9150 functions as a base station, it communicates with a **9010/ TCP/IP**
host. The 9010 protocol is a proprietary asynchronous protocol developed by Psion
Teklogix which uses TESS (Teklogix Screen Subsystem) or ANSI data streams to
communicate with terminals. For detailed information, please refer to the appropriate
Teklogix User Manual for: *9400 Network Controller, TSDK, TESS* or *ANSI*.

However, when the 9150 acts as a mini-controller, it uses the 3274 and 5250 emula-
tion protocols to communicate with IBM hosts, or the ANSI emulation protocol to
communicate with ANSI hosts. For detailed information on configuring the 9150 as
a mini-controller, please refer to Chapter 6: "Mini-Controller Configuration".

Terminal Range

The values entered in this parameter designate the first and last terminals in the
range of terminals that will communicate with the host. These terminal numbers are
mapped to this particular host.

5.5 Host Menu Options

When you choose an existing host from the *Hosts* listbox and then select the Configure button, the 9150 displays the *Host Menu*.
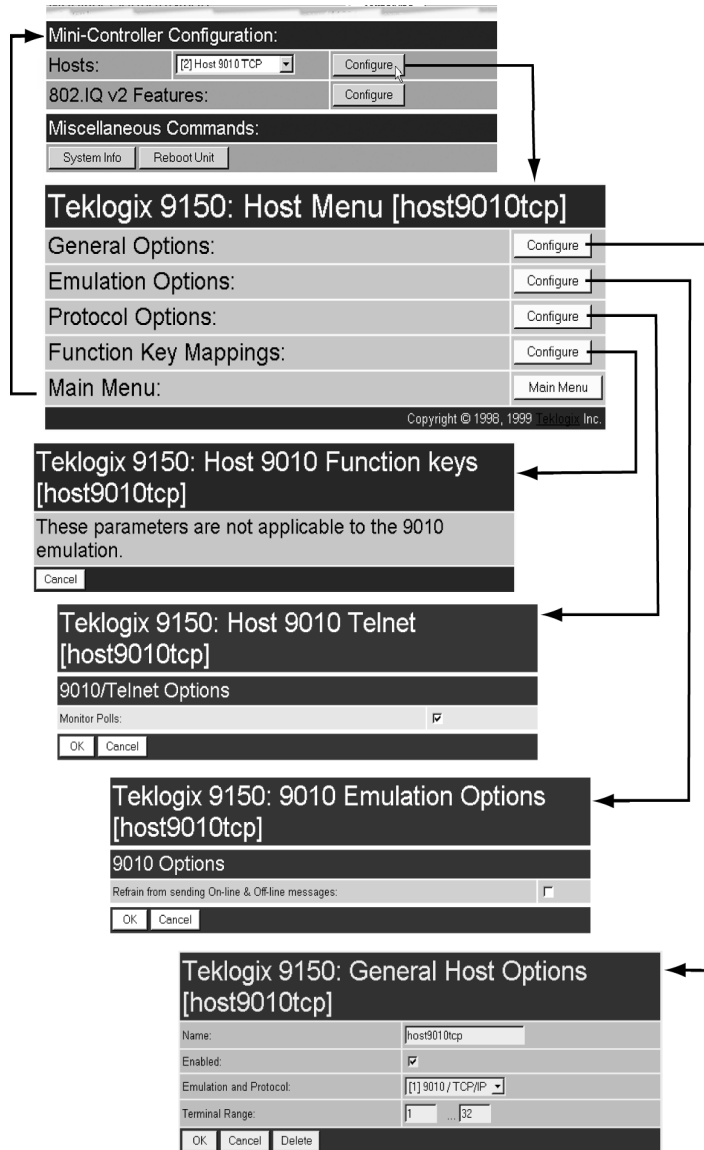
Figure 5.5 Overview Of Host Menus For 9010 / TCP/IP

The *Host Menu* has four configuration sub-menus:

"General Host Options"
> When you select this sub-menu, the 9150 displays the General Options page for the host.

"Emulation Options"
> When you select this sub-menu, the 9150 displays the Emulation Options page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

"Protocol Options"
> When you select this sub-menu, the 9150 displays the Protocol Options page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

"Function Key Mappings" (3274, 5250, ANSI emulations only)
> When you select this sub-menu, the 9150 displays the Function Key Mapping page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

There is also a *Main Menu* button. When you select this button, the 9150 displays the *Configuration Main Menu (see page 109)*.

5.5.1 9010 / TCP/IP

For an overview of Host menus for 9010/TCP/IP, refer to Figure 5.5 on page 143.

5.5.1.1   General Host Options

In this screen, you can select general options for the host connection. The host connection may also be deleted. When choosing to delete a host from the Hosts list, you will be prompted for confirmation of the deletion, which will give you the opportunity to cancel the action.

Name

This parameter allows you to enter a name for the new host.

Enabled

The *Enabled* option must be turned on (√) for terminals to communicate with this host.

Emulation and Protocol

This parameter allows you to select the emulation and protocol to be used for the connection to this host. For a network connection, use **9010/ TCP/IP**.

Terminal Range

This parameter allows you to specify the range of terminals which will communicate with this host. The left-hand textbox contains the lowest terminal number which is allowed to communicate with the host; the right-hand textbox contains the highest terminal number. Terminal numbers may range from **1** to **3840**.

5.5.1.2   Emulation Options

Teklogix 9150: 9010 Emulation Options
[host9010tcp]
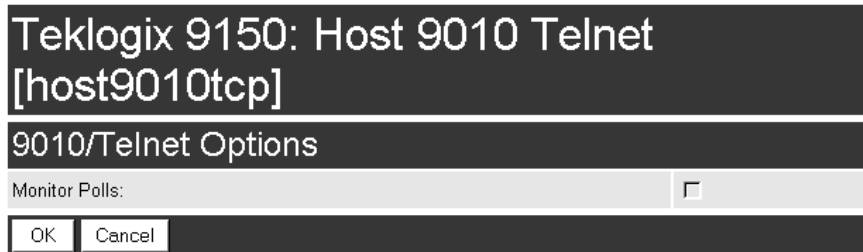
9010 Options

Refrain from sending On-line & Off-line messages:

OK   Cancel
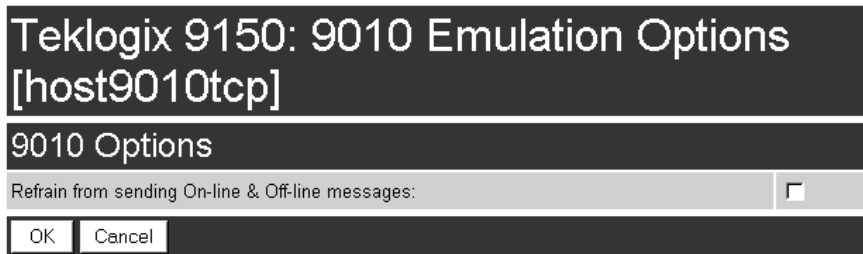
Refrain from sending On-line & Off-line messages

If this parameter is **enabled** (√), the 9150 base station **does not** notify the host if the status of a terminal changes between offline and online. If this parameter is **disabled**, the 9150 **does** notify the host regarding any terminal status changes. The default for this parameter is **disabled**.

5.5.1.3   Protocol Options

Teklogix 9150: Host 9010 Telnet
[host9010tcp]

9010/Telnet Options

Monitor Polls: ☐

OK   Cancel

9010/Telnet Options: Monitor Polls

Hosts usually send messages or null polls to the 9150 within a period of approximately 40 seconds. If the parameter is **enabled** (√), the 9150 base station monitors messages and polls from this host; if it does not receive a message or poll within 40 seconds, it closes the connection. The default for this parameter is **disabled**.

5.5.1.4   Function Key Mappings

These parameters are not applicable to the 9010 / TCP/IP emulation.

MINI-CONTROLLER CONFIGURATION 6

6.1 Overview

The network controller in a Teklogix system performs a number of important tasks. One of these tasks is *emulation*: the translation of data between the protocol of the host computer and the protocol used by Teklogix terminals.

The data which is sent from a host computer to a terminal to provide its display, and returned to the host as a result of operations at the terminal, is called a data stream. Host computers can provide data streams of various types to their terminals.

Teklogix terminals can directly accept only two types of data stream: *TESS* and *ANSI*. TESS (Teklogix Screen Subsystem) is the proprietary data stream used by Teklogix terminals. ANSI data streams are a standard type of data stream used by wired ANSI terminals. Other types of data stream provided by the host must be converted into TESS or ANSI before Teklogix terminals can work with them. This translation is done by emulation software in a network controller.

The 9150 is equipped with emulation capabilities, allowing it to act as a mini-controller. When a 9150 is configured as a mini-controller, Teklogix terminals can emulate an ANSI, 5250 or 3274 terminal via a 9150 rather than through a 9400 Network Controller. Using the RF Modem/Telnet emulation, the 9150 can also communicate with a Teklogix 6040 RF Modem.

⚠️ ***Important:*** ***9150s acting as mini-controllers are designed for small, low-transaction sites. A 9400 Network Controller is required for systems that support more than 50 terminals.***

Acting as a mini-controller, the 9150 can support up to 32 additional networked base stations and up to 50 terminals. A 9150 mini-controller can also manage wireless LAN configurations.

A 9150 configured as a mini-controller can support the following emulations:

- 5250 emulation using TCP/IP over an Ethernet LAN.
- 3274 emulation using TCP/IP over an Ethernet LAN.
- ANSI emulation using TCP/IP over an Ethernet LAN.
- RF Modem emulation using TCP/IP over an Ethernet LAN.

📖 *Note: The 9150 main parameters should first be set up as described in Chapter 3: "9150 Main Configuration".*

The 9150 can also be integrated into a mapRF system, using 802.IQv2 protocol (for details, please refer to the "802.IQ V2 Features Menu" on page 201).
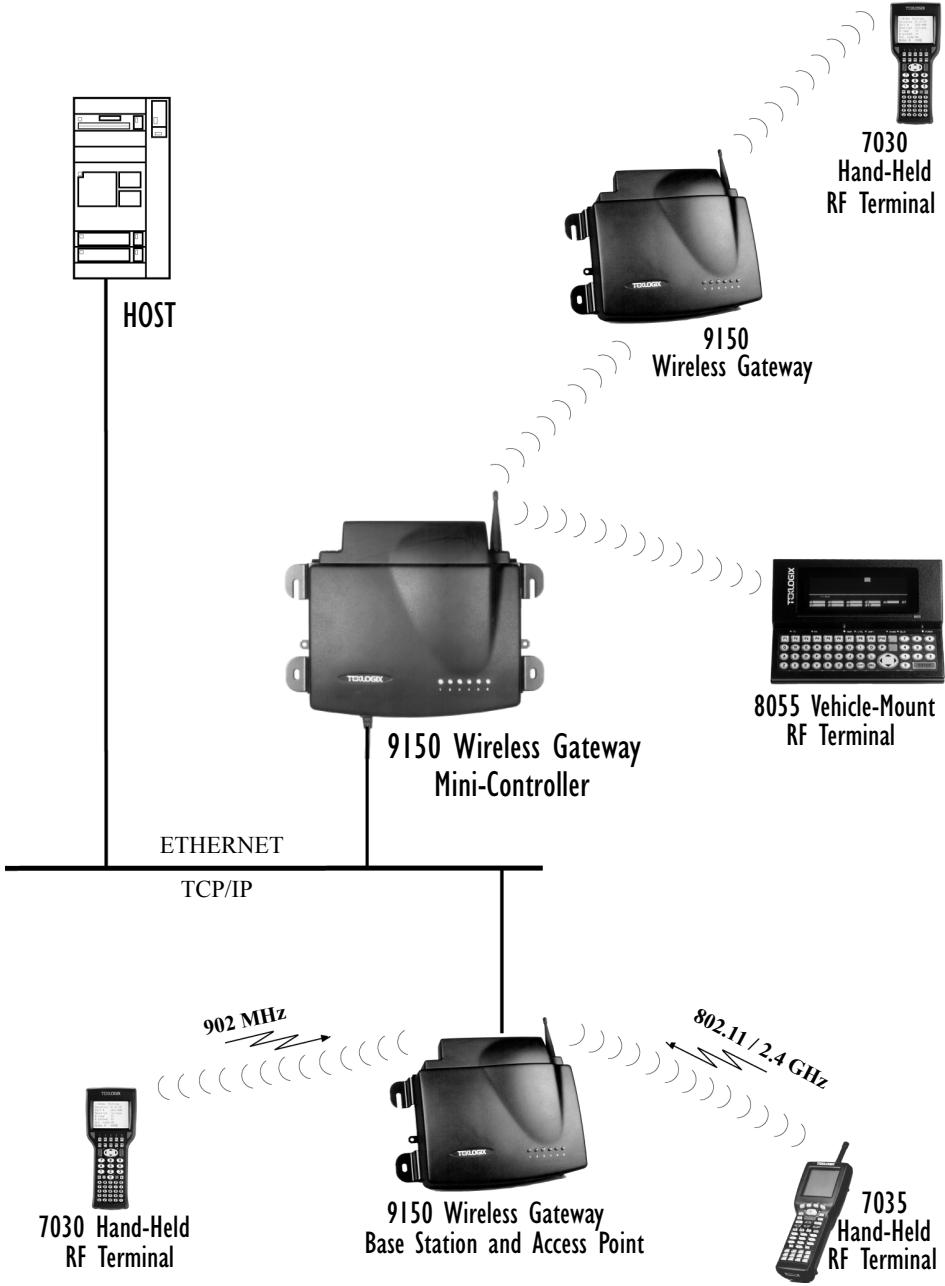
Figure 6.1 9150 Mini-Controller Configuration

6.2 Mini-Controller Configuration Menu

For operation as a mini-controller, the parameters in the *Hosts* pages under *Mini-Controller Configuration* should be set appropriately. The *Hosts* options are found on the *Configuration Main Menu* page. For information on configuring radio protocol parameters, please refer to "Radio Link Features" on page 136.

6.3 Hosts Menu

The drop-down menu in this option shows the host names present on the system. Up to six hosts can be supported. A "host" must be configured for each host that communicates with the 9150 mini-controller. Opening the *Configure* dialog box for a selected host lists the parameters that can be modified or deleted for that host.
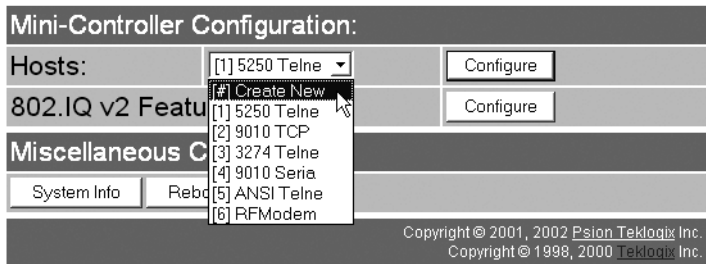
New hosts can be added by selecting "[#] Create New" in the drop-down menu before entering the *Configure* dialog box.
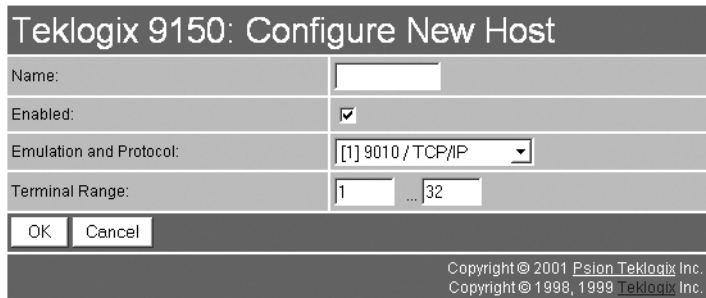
Name

This parameter indicates the assigned host name. The host name also appears on the RF terminal when switching between hosts in a multiple-host environment.

Enabled

The *Enabled* option must be turned on (√) for terminals to communicate with this host.

Emulation and Protocol

This drop-down menu provides a list of host emulations and communication proto-cols supported by the 9150. Working with Teklogix terminals and base stations, the 9150 can emulate IBM 3278-2, 5251-11, and 5555-B01 terminals, as well as ANSI terminals and RF Modems.

Protocols are the methods by which terminals communicate with host computers over various media such as Ethernet and radio-link connections. The 9150 supports the TCP/IP protocol. The supported emulations with their respective protocols are:

- 9010/ TCP/IP (See page 158 for Configuration Parameters).
- 3274/Telnet (See pages 158 to 173 for Configuration Parameters).
- 5250/Telnet (See pages 174 to 188 for Configuration Parameters).
- ANSI/Telnet (See pages 189 to 199 for Configuration Parameters).
- RF Modem/Telnet (See page 200 for Configuration Parameters).

When the 9150 acts as a base station, it uses the 9010 emulation (a proprietary asynchronous protocol developed by Psion Teklogix) to communicate with a 9400 Network Controller or a host using a Teklogix Software Development Kit (TSDK). For detailed information on configuring the 9150 as a base station, please refer to Chapter 5: "Base Station Configuration".

When the 9150 acts as a mini-controller, it uses the 3274 and 5250 emulation protocols to communicate with IBM hosts, or the ANSI emulation protocol to com-municate with ANSI terminals. To communicate with a Teklogix 6040 RF Modem, the 9150 uses the RF Modem/Telnet emulation protocol.

Terminal Range

The values entered in this parameter designate the first and last terminals in the range of terminals that will communicate with the host. These terminal numbers are mapped to this particular host. Terminal numbers may range from **1** to **50**.

6.4 Host Menu Options

When you choose an existing host name from the *Hosts* listbox and then select the *Configure* button, the 9150 displays the *Host Menu*. The *Host Menu* presents the options for four sub-menus: *General Host Options*, *Emulation Options*, *Protocol Options*, and *Function Key Mappings*. There is also a *Main Menu* button. When you select this button, the 9150 displays the *Configuration Main Menu* page (see page 151 for an enlarged illustration).
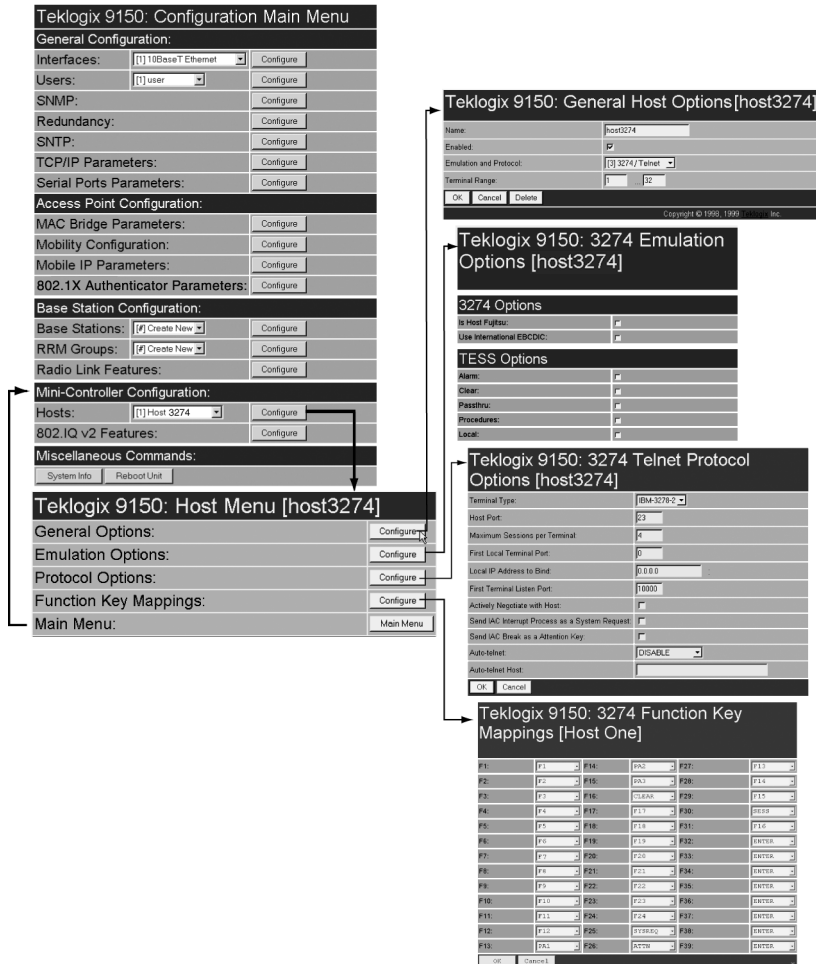
Figure 6.2 Overview Of Host Menu and Sub-Menus

As illustrated in Figure 6.2 on page 155, the four configuration sub-menus display the following options:

"General Options"

When you select this sub-menu, the 9150 displays the *General Options* page for the host.

"Emulation Options"

When you select this sub-menu, the 9150 displays the *Emulation Options* page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

"Protocol Options"

When you select this sub-menu, the 9150 displays the *Protocol Options* page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

"Function Key Mappings"

When you select this sub-menu, the 9150 displays the *Function Key Mappings* page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

Note: *The* Function Key Mappings *parameters are not applicable to either of the 9010 emulations.*

6.4.1 General Options

In this screen, you can select general options for the host connection. The host connection may also be deleted (see "Delete" on page 158).

Teklogix 9150: General Host Options[host3274]

Name:	host3274
Enabled:	☑
Emulation and Protocol:	[3] 3274 / Telnet ▾
Terminal Range:	1 ... 32

OK   Cancel   Delete

Name

This parameter allows you to enter a name for the new host.

Enabled

The *Enabled* option must be turned on (√) for terminals to communicate with this host.

Emulation and Protocol

This parameter allows you to select the emulation and protocol to be used for the connection to this host. Available combinations of emulation and protocol are: **3274/Telnet**, **5250/Telnet**, **ANSI/Telnet, RF Modem/Telnet**.

Terminal Range

This parameter allows you to specify the range of terminals which will communicate with this host. The left-hand textbox contains the lowest terminal number which is allowed to communicate with the host; the right-hand textbox contains the highest terminal number. Terminal numbers may range from **1** to **50**.

Delete

When choosing to delete a host from the Hosts list, you will be prompted for confirmation of the deletion, which will give you the opportunity to cancel the action.

6.4.2 9010 Emulations

When the 9150 acts as a base station, it uses the 9010 protocol (a proprietary asynchronous protocol developed by Psion Teklogix) to communicate with a 9400 Network Controller, or a host using a Teklogix Software Development Kit (TSDK). For detailed information on configuring the 9150 as a base station, please refer to Chapter 5: "Base Station Configuration".

6.4.3 3274/Telnet

6.4.3.1 Emulation Options

When in the *Host Menu* for a 3274/Telnet host, selecting the Configure button for the *Emulation Options* page will open the 9150 mini-controller's 3274/Telnet version of that page.

With IBM 3274, or IBM 5250 emulation, the 9150 mini-controller converts the application data stream from the host to TESS (Teklogix Screen Subsystem) commands. Some of the parameters in this page govern the conversion of the host screens to TESS.

Teklogix 9150: 3274 Emulation Options [3274 Telne]

3274 Options

Is Host Fujitsu:	☐
Use International EBCDIC:	☐
Allow null character in fixed fields:	☐

TESS Options

Alarm:	☐
Clear:	☐
Passthru:	☐
Procedures:	☐
Local:	☐
Host Print:	☐
Remote Print:	☐
Pages:	8
Transmit Line:	0
AIAG:	0
Visible Match Character:	0
Hidden Match Character:	0
Serial I/O:	0
Print Line:	0
Print Form Length:	0
Barcode:	0
Entry Line:	0
Field Overhead:	5
Command Region:	0 , 0 - 0 , 0

OK   Cancel

Is Host Fujitsu

If this parameter is **enabled**, the 9150 mini-controller expects the data from the host to contain commands, etc., native to a Fujitsu host. Enabling this parameter causes the standard IBM formatting codes (for start of field, setting buffers, etc.) to be replaced by the codes used by Fujitsu host computers.

Use International EBCDIC

If this parameter is **enabled**, the 9150 mini-controller uses the International EBCDIC character set, swapping the positions of the **!** and **]** characters.

Allow null character in fixed fields:

If this parameter is **enabled**, the 9150 mini-controller allows null characters in the whitespace in fields that have visual video attributes such as reverse video. The default for the 3274 host emulation is **disabled**.

Alarm

When this parameter is **enabled**, terminals beep when the word "ALARM" appears on the application screen in the location specified by the *Command Region* parameter (see page 169). The word "ALARM" should be a *display-only* field.

Note: The Command Region *parameter must be enabled for this parameter to work.*

Clear

If this parameter is **enabled**, the 9150 mini-controller creates an *empty* entry field for an entry field that is filled with spaces.

Some host applications rely on the video attributes of displayed characters to highlight fields, particularly entry fields. For example, the application screen may define all entry fields with reverse video and fill the field with spaces. This is effective on terminals that support reverse video, but on terminals that do not, it can make the field invisible since it is made up entirely of spaces.

By default, all empty entry fields displayed at the Teklogix terminal are highlighted by the "entry character" chosen in the terminal's configuration (not all Teklogix terminals support video attributes).

> *Note: This operation is only performed on screens received **from the host.** Data sent **to the host** remains unaffected.*

Passthru

If this parameter is **enabled**, the 9150 allows the host to send data directly to the RF terminal's serial port. This is most commonly used for printing.

Preparing Host Screens for Pass-Through

On the screen to be sent through the terminal serial port, the word ***PASSTHRU*** (in capital letters) must appear on the first line, starting on the second column. The actual data to be sent to the terminal may start anywhere below the first line.

With 5250 or 3274 emulations, attributes occupy a position in the screen buffer. An attribute placed between column 2 and the end of the word "PASSTHRU" will 'push' all following characters one position to the right. Therefore, any required attributes should occupy column 1 of the first line (just preceding the word "PASSTHRU").

Example:

```
column: 1 2 3 4 5 6 7 8 9
line 1: @ P A S S T H R U @
line 2: @ P A R T :   1 2 3 4 5
```

where **@** *is an attribute.*

When the 9150 is finished sending the data to the terminal's printer, it will send an *ENTER* key to the host. The host must wait for the *ENTER* key before sending any more screens (including other PASSTHRU screens) to this terminal.

> *Note: Refer to the Terminals User Manual for information about setting parameters on the terminal for pass-through.*

Procedures

If this parameter is **enabled**, the host may send TESS procedures through the 9150 to the terminals. A TESS procedure is a group of TESS commands that can be executed by the TESS *execute procedure* command.

Local

If this parameter is **enabled**, the 9150 allows the host to provide pages to be loaded as local TESS procedures in the terminals.

The local procedures are selected from a menu at the terminal. The terminals can perform these procedures when they are offline. Later when the terminals are online, they send the results of these functions to the host.

Note: *The* Procedures *parameter must also be **enabled** for* Local *to work.*

Host Print

When this parameter is **enabled**, the host can send extra data to the terminal's screens, and instruct the terminal to print it. This is in contrast to the *Local Print* feature, where the terminal makes the initial print request.

The text that is passed to the printer is formatted into the 24 x 80 application screen. If the host can initiate the print operation, the text is printed. The 9150 identifies the additional text as a print page by the presence of the word "PRINT" (in capital letters) beginning in the 2nd column of line 13 on the 24 x 80 screen. The word "PRINT" should be defined as *display-only* text.

The print page is positioned below the terminal's display page (see the following figure). The size of the print page is always the same as the terminal's display page (assuming that in the terminal's configuration, the page length is less than 12 lines).

When *Host Print* is **enabled**, the 9150 passes the print page to the terminal after receiving the application screen from the host.

```
1
2
3
4          Display Page (8 x 40)
5
6
7
8
9
10
11
12
13
14   PRINT
15
16
17
18
19
20          Print Page (8 x 40)
21
22
23
24
```
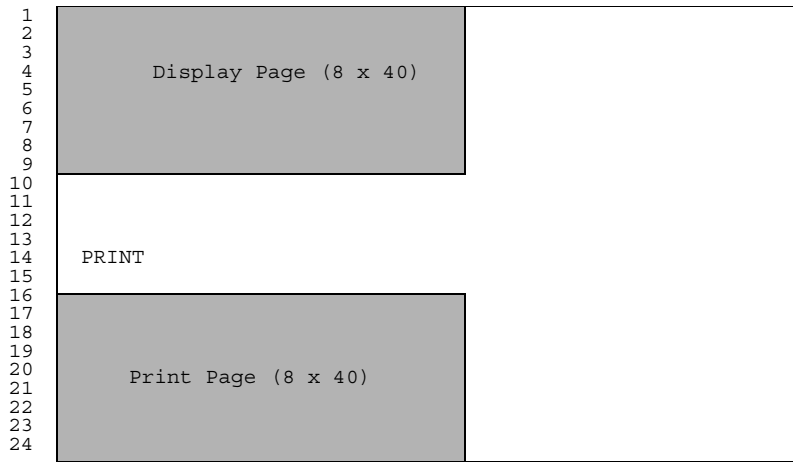
Figure 6.3 Application Screen With Print Page

Notes:

1. *Unlike the* Passthru *option, when using* Host Print *no escape commands can be sent to the printer.*

2. *Support for printing must be enabled at the terminal in its* Printer *command under the TESS Features menu; refer to the appropriate Terminals User Manual for more information.*

Remote Print

When this parameter is **enabled**, the 9150 sends the print page to a terminal whenever the terminal requests it (by sending the "F17" function key from the terminal, or the "PRINT" key on older terminals). The 9150 sends the function response back to the host.

This is in contrast to *Host Print*, where the host makes the initial print request.

Note: *Support for printing must be enabled at the terminal. Refer to the Terminals User Manual or the Parameter Guide for more information.*

Pages

This parameter determines the number of host screens (or pages) stored at the terminal, to a maximum of **16**.

The 9150 reduces data transmitted to the terminals by using the terminal's capability to store a page of data for each screen it displays. The 9150 maintains an image of each page stored at the terminal. After receiving an application screen, the 9150 tries to match the screen with a stored page. If a similar page is already in the terminal's memory, the 9150 instructs the terminal to redisplay its copy of the page; only the necessary changes are sent from the controller. If no match is found, the complete page is sent to the terminal over the radio link.

Note: *There is a corresponding parameter on the terminal itself, and the **actual** number of saved pages will be the **smaller** of the two values.*

Transmit Line

When this feature is **enabled**, all modified data at the terminal is automatically transmitted when the operator enters data into a *transmit-upon-entry* field.

The value in this textbox specifies the line on the screen which is designated the *transmit line*. The last entry field above or on the transmit line on the screen will be identified as the *transmit-upon-entry* field. If any entry fields exist on lines below the transmit line, no entry field will be designated as the *transmit-upon-entry* field.

A value of **0** (zero) disables this feature. A value of **24** designates the *last* entry field on each application screen as *transmit-upon-entry*.

AIAG

This parameter provides auto-locate and fill for input coming from bar code readers. When bar code data is entered at a terminal, the terminal searches for "AIAG" fields on the current page that can accept the bar code data. The data preloaded into the "AIAG" field by the application program determines whether or not the bar code data is accepted.

At the 9150 mini-controller, a decimal value of an ASCII character from **0** to **127** is set to match the "AIAG Field Identifier" set at the host. A value of **0** disables this feature.

The format of the preloaded data is as follows:

`<mode> <AIAG prefix(data)>`

The mode character used with the command allows for different operating modes to suit various application operations. The automatic locate and fill operation applies only to data received from a bar code reader. Descriptions of the modes and AIAG prefix are listed in Table 6.1 on page 165. **These modes are set at the host.**

Mode	Function
0	Display prefix, send prefix to host.
1	Do not display prefix, send prefix to host.
2	Display prefix, do not send prefix to host.
3	Do not display prefix, do not send prefix to host.
+4	Add 4 to above values to cause transmit to host when all AIAG fields with 4 set are filled. Function 0 is "pressed" if there are any fields with this bit set, and all fields with this bit set have been filled by operator input.
+8	Add 8 to above values to allow overwrite of previously entered data.
+16	Add 16 to above values to indicate cursor position priority for search and fill.
AIAG Prefix (data)	The text to be matched in the AIAG field.

Table 6.1 Mode Functions And AIAG Prefix Description

Example:

The information in the sample screen below is defined at and sent ***from*** the host. It includes the "AIAG Identifier" – the tag identifying this as an AIAG field – followed by the mode, in this case Mode 0, and finally, the "AIAG Prefix" – I.
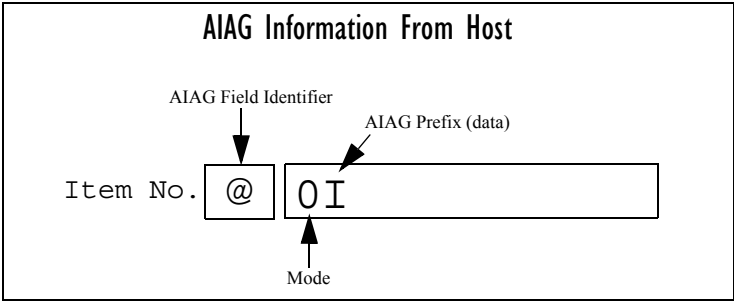
Figure 6.4 AIAG Field Sent From The Host

When the information arrives at the terminal screen, the appropriate AIAG field for the scanned information is located using the "AIAG Identifier". Because Mode 0 was set at the host, the "AIAG Prefix" – I – is displayed on the terminal screen, and when this screen is completed, the prefix will be sent back to the host.
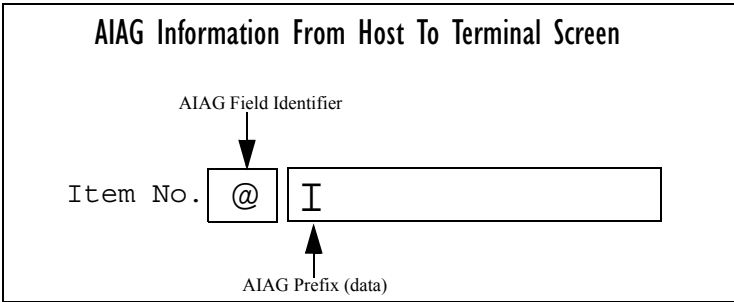
Figure 6.5 AIAG Field Sent To The Terminal

Visible Match Character

By inserting a special ASCII character directly before an entry field, the application program distinguishes a "match field" from an entry field. For example, suppose an angle bracket ">" is defined for visible match fields.

Inserting ">" immediately preceding the entry field identifies it as a match field, as illustrated below.

Part #> _____

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** disables this feature. The ASCII decimal value entered at the 9150 must coincide with the value set by the application program.

To use the *Visible Match* feature, the host computer preloads data into a match entry field; the data is visible on the terminal screen. The preloaded data sent to a terminal can consist of exact characters, special match characters or a combination of the two. Refer to Table 6.2 on page 167 for match characters recognized by Teklogix terminals.

If an entry does not match the preloaded data, the entry is displayed, the terminal beeps, and the cursor moves to the first position in the match field. The operator can either make another entry in the match field, or move the cursor to a new field. When an entry (even one that doesn't match the preloaded data) is made in a match field, the entry is sent to the host as part of the terminal's modified data during the next transmission.

Character	Description
#	Match a number.
&	Match a letter (either case).
^	Match an uppercase letter.
_	Match a lowercase letter.
|	Match an alphanumeric character.
"	Match a letter, number or space.
?	Match a punctuation character.
'	Match any character.
:	Match all character positions in the field with the preceding character.
;	Match any remaining characters, but not necessarily the remainder of the field, with the preceding character.

Table 6.2 Match Characters

Example:

Suppose you want to preload an entry field with a part number. If the part number is known, you can preload the field with that part number. If more flexibility is needed, and the part number always begins with two alphabetic characters followed by a hyphen and four digits, the match string for the field would be: `&&-####` .

Hidden Match Character

Unlike data in a "visible match" field, the preloaded data in a "hidden match" field is *not* displayed at the terminal.

Note: Refer to "Visible Match Character" on page 166 for detailed information about field matching.

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** disables this feature. The ASCII decimal value entered at the 9150 must coincide with the value set by the application program.

Serial I/O

Serial I/O fields are special entry and fixed fields that accept input from and output to a serial port. The application program distinguishes this field as *Serial I/O* by preceding the field with a special character.

If this character precedes a fixed field, the data will be sent to the terminal's serial port. If it precedes an entry field, the field accepts data from the terminal's serial port.

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** (zero) disables this feature.

Print Line

This parameter allows you to enter the starting line number of the print page in the application screen. A value of **1** causes the display page to be printed; a value of **0** (zero) disables this feature.

Print Form Length

This parameter sets the printer's form length in lines. The range is **0** to **24**.

Barcode

Barcode-input-only fields are special entry fields that only accept input from a bar code reader. The application program distinguishes an entry field as *barcode-input-only* by preceding the field with a special character.

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** (zero) disables this feature.

Entry Line

This parameter contains the number of the first line displayed if there is no entry field in the upper-left portion of the screen, and if an entry field is at or below this line.

The *Entry Line* parameter allows an automatic offset within the host screen, so that the area displayed by the terminal includes an entry field that would normally be out of bounds. Normally, Teklogix terminals only display the upper-left corner of the application screen because of their smaller display size.

Field Overhead

This parameter contains the maximum number of characters allowed between two *fixed* fields which still allows the 9150 to join them into one field.

Sometimes the 9150 will join two adjacent fixed fields and then send them as one field. This reduces the overhead on the radio link.

For example, if two fields were 4 characters apart and this parameter was '5', then these fields would be joined into one.

Command Region

This parameter defines a region of the host screen which the 9150 will examine for the presence of reserved commands.

The four numbers in the *Command Region* textboxes represent the row and column addresses of the upper left corner and the lower right corner of the command region. The first textbox of each pair contains the row number; the second contains the column number. The range of row values is **0** to **24**; column values are **0** to **80**.

To define the last two lines of the host screen as the command region, for example, enter the values *23, 1* and *24, 80*.

Currently, the only command supported is *ALARM* (refer to page 160 for details on this command). When the word "ALARM" is placed anywhere within the command region, the 9150 will send a TESS *beep* command to the terminal.

6.4.3.2   Protocol Options

This page differs depending on the type of emulation and protocol selected in the *General Host Options* page (see page 157). The 9150 displays this version of the *Protocol Options* page when you select the emulation/protocol combination of *3274/Telnet* for this host.

Teklogix 9150: 3274 Telnet Protocol Options [host3274]

Terminal Type:	IBM-3278-2
Host Port:	23
Maximum Sessions per Terminal:	4
First Local Terminal Port:	0
Local IP Address to Bind:	0.0.0.0
First Terminal Listen Port:	0
Actively Negotiate with Host:	☐
Send IAC Interrupt Process as a System Request:	☐
Send IAC Break as a Attention Key:	☐
Auto-telnet:	DISABLE
Auto-telnet Host:	

OK   Cancel

Terminal Type

This parameter allows you to choose the type of terminal to be emulated by the 9150 for this host. At present there is only one choice of terminal for *3274/Telnet*: the **IBM 3278-2**.

Host Port

This parameter allows you to enter a host port value for the selected *3274/Telnet* host connection. The default value is **23**.

Maximum Sessions per Terminal

This parameter contains the maximum number of telnet sessions which are allowed to originate from each terminal. The range is **0** to **127**, with a default value of **4**.

First Local Terminal Port

This parameter contains the local port number from which the first terminal will connect on outbound telnet sessions. The default value is **0**.

Local IP Address to Bind

This parameter contains the IP address of the network adaptor in the 9150 from which the first terminal will connect on outbound telnet sessions.

First Terminal Listen Port

This parameter specifies the first port number at which the 9150 will listen for telnet connection requests to the terminals. To **enable** this parameter, the value must be a minimum of **1024**. To **disable** the listen port, the value must be **0**.

The default value is **0** (disabled).

Actively Negotiate with Host

If this parameter is enabled, the 9150 starts negotiations with the host during setup of the telnet connection. Not recommended for most hosts.

Send IAC Interrupt Process as a System Request

If this parameter is enabled, the 9150 sends the IAC Interrupt Process request to the host as a 3274 System Request.

Send IAC Break as an Attention Key

If this parameter is enabled, the 9150 sends the IAC Break request to the host as a 3274 Attention key.

Auto-telnet

This parameter enables you to disable or enable automatic connection of telnet sessions from terminals to this host.

The choices provided are: **Disable** and **Auto-telnet**. The default value is **Disable**.

When *Auto-telnet* is **disabled**, telnet sessions from the terminals to the host must be initiated manually from the terminals.

When *Auto-telnet* is **enabled**, the 9150 initiates one telnet session from each terminal whose terminal number is mapped to this host. Additional telnet sessions may be initiated from each terminal to the host, but they must be initiated manually.

When *Auto-telnet* is **enabled**, the 9150 will automatically telnet to the host, both on startup and when the session is closed.

Note: Auto-telnet sessions are only initiated for terminals which are "online" (turned on and operating properly on the Teklogix RF network).

Auto-telnet Host

This parameter contains the host name or IP address for the host to which the 9150 connects Auto-telnet sessions.

Note: A host name placed in this textbox must be "resolvable" by the 9150: the 9150 must be able to obtain an IP address for it. For example, the host name may correspond to an entry in the 9150's host table, or the 9150 may be able to query a domain-name server.

Any host name which can be used at the terminal's TCP> prompt may be used here.

6.4.3.3 Function Key Mappings

This page differs depending on the type of emulation selected in the *General Host Options* page. The 9150 displays this version of the *Function Key Mapping* page when you select *3274* emulation for this host.

Teklogix 9150: 3274 Function Key Mappings [host3274]

F1:	F1	F14:	PA2	F27:	F13
F2:	F2	F15:	PA3	F28:	F14
F3:	F3	F16:	CLEAR	F29:	F15
F4:	F4	F17:	F17	F30:	SESS
F5:	F5	F18:	F18	F31:	F16
F6:	F6	F19:	F19	F32:	ENTER
F7:	F7	F20:	F20	F33:	ENTER
F8:	F8	F21:	F21	F34:	ENTER
F9:	F9	F22:	F22	F35:	ENTER
F10:	F10	F23:	F23	F36:	ENTER
F11:	F11	F24:	F24	F37:	ENTER
F12:	F12	F25:	SYSREQ	F38:	ENTER
F13:	PA1	F26:	ATTN	F39:	ENTER

OK   Cancel

Function key n

The *Function Key* parameter allows you to select a code that will be sent to the host when you press a function key on the terminal. Each function key may be chosen from the same range of possible codes; however, each function key has a different default code. The default values are shown on this page.

6.4.4 5250/Telnet

6.4.4.1 Emulation Options

The 9150 displays this version of the *Emulation Options* page after you have selected the *5250/Telnet* emulation/protocol combination for this host connection.

With IBM 5250, or IBM 3274 emulation, the 9150 mini-controller converts the application data stream from the host to TESS (Teklogix Screen Subsystem) commands. Some of the parameters in this page govern the conversion of the host screens to TESS.

Write Error Code

If *advisory text* is selected here, the 9150 sends error codes to the terminal screen as advisory text, which is written at the bottom of the screen. If *screen text* is chosen, the 9150 sends the error codes as regular screen text.

Use International EBCDIC

If this parameter is **enabled**, the 9150 will swap the positions of the **!** and **]** characters in the EBCDIC character table.

Allow null character in fixed fields:

If this parameter is **enabled**, the 9150 mini-controller allows null characters in the whitespace in fields that have visual video attributes (such as reverse video). The default for the 5250 host emulation is **enabled**.

Alarm

If this parameter is **enabled**, terminals will beep when the word "ALARM" (in capital letters) appears on the application screen, in the location specified by the *Command Region* parameter (see page 184). The word "ALARM" should be a *display-only* field.

Note: *The* Command Region *parameter must be **enabled** for this parameter to work.*

Clear

If this parameter is **enabled**, the 9150 mini-controller creates an *empty* entry field for an entry field that is filled with spaces.

Some host applications rely on the video attributes of displayed characters to high-light fields, particularly entry fields. For example, the application screen may define all entry fields with reverse video and fill the field with spaces. This is effective on terminals that support reverse video, but on terminals that do not, it can make the field invisible since it is made up entirely of spaces.

By default, all empty entry fields displayed at the Teklogix terminal are highlighted by the "entry character" chosen in the terminal's configuration (not all Teklogix terminals support video attributes). The *Clear* feature creates an empty entry field in place of an entry field filled with spaces.

Note: *This operation is only performed on screens received **from the host**. Data sent **to the host** remains unaffected.*

Passthru

If this parameter is **enabled**, the 9150 allows the host to send data directly to the RF terminal's serial port. This is most commonly used for printing.

Preparing Host Screens for Pass-Through

On the screen to be sent through the terminal serial port, the word "PASSTHRU" (in capital letters) must appear on the first line, starting on the second column. The actual data to be sent to the terminal may start anywhere below the first line.

With 5250 or 3274 emulations, attributes occupy a position in the screen buffer. An attribute placed between column 2 and the end of the word "PASSTHRU" will push all following characters one position to the right. Therefore, any required attributes should occupy column 1 of the first line (just preceding the word "PASSTHRU").

Example:

```
column: 1 2 3 4 5 6 7 8 9

line 1: @ P A S S T H R U @

line 2: @ P A R T :   1 2 3 4 5
```

*where **@** is an attribute.*

When the 9150 is finished sending the data to the terminal's printer, it will send an "ENTER" key to the host. The host must wait for the "ENTER" key before sending any more screens (including other "PASSTHRU" screens) to this terminal.

Note: *Refer to the appropriate Terminals User Manual for information about setting parameters on the terminal for pass-through.*

Procedures

If this parameter is **enabled**, the host may send TESS procedures through the 9150 to the terminals. A TESS procedure is a group of TESS commands that can be executed by the TESS *execute procedure* command.

Local

If this parameter is **enabled**, the 9150 allows the host to provide pages to be loaded as local TESS procedures in the terminals.

The local procedures are selected from a menu at the terminal. The terminals can perform these procedures when they are offline. Later when the terminals are online, they send the results of these functions to the host.

Note: *The* Procedures *parameter must also be* ***enabled*** *for* Local *to work.*

Host Print

When this parameter is **enabled**, the host can send extra data to the terminal's screens, and instruct the terminal to print it. This is in contrast to the Local Print feature, where the terminal makes the initial print request.

The text that is passed to the printer is formatted into the 24 x 80 application screen. If the host can initiate the print operation, the text is printed. The 9150 identifies the additional text as a print page by the presence of the word "PRINT" (in capital letters) beginning in the 2nd column of line 13 on the 24 x 80 screen. The word "PRINT" should be defined as *display-only text*.

The print page is positioned below the terminal's display page (see Figure 6.6 on page 178). The size of the print page is always the same as the terminal's display page (assuming that in the terminal's configuration, the page length is less than 12 lines).

When *Host Print* is **enabled**, the 9150 passes the print page to the terminal after receiving the application screen from the host.

```
 1
 2
 3
 4        Display Page (8 x 40)
 5
 6
 7
 8
 9
10
11
12
13
14    PRINT
15
16
17
18
19
20        Print Page (8 x 40)
21
22
23
24
```
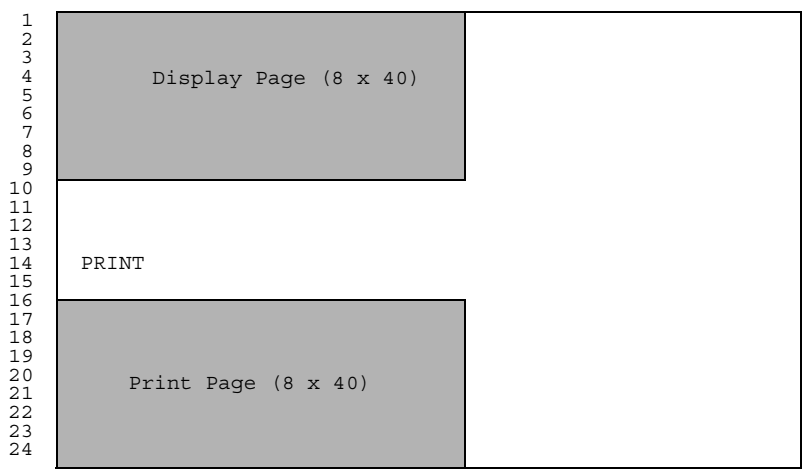
Figure 6.6 Application Screen With Print Page

Notes:

1. Unlike the Passthru *option, when using* Host Print *no escape commands can be sent to the printer.*

2. Support for printing must be enabled at the terminal in its Printer *command under the TESS Features menu; refer to the appropriate Terminals User Manual for more information.*

Remote Print

When this parameter is **enabled**, the 9150 sends the print page to a terminal whenever the terminal requests it (by sending the "F17" function key from the terminal, or the "PRINT" key on older terminals). The 9150 sends the function response back to the host.

This is in contrast to *Host Print*, where the host makes the initial print request.

Note: Support for printing must be enabled at the terminal level. Refer to the appropriate Terminals User Manual for more information.

Pages

This parameter determines the number of host screens (or pages) stored at the terminal, to a maximum of **16**.

The 9150 reduces data transmitted to the terminals by using the terminal's capability to store a page of data for each screen it displays. The 9150 maintains an image of each page stored at the terminal. After receiving an application screen, the 9150 tries to match the screen with a stored page.

If a similar page is already in the terminal's memory, the 9150 instructs the terminal to re-display its copy of the page; only the necessary changes are sent from the controller. If no match is found, the complete page is sent to the terminal over the radio link.

*Note: There is a corresponding parameter on the terminal itself, and the **actual** number of saved pages will be the **smaller** of the two values.*

Transmit Line

When this feature is **enabled**, all modified data at the terminal will be automatically transmitted when the operator enters data into a *transmit-upon-entry* field.

The value in this textbox specifies the line on the screen which is designated the *transmit line*. The last entry field above or on the transmit line on the screen will be identified as the *transmit-upon-entry* field. If any entry fields exist on lines below the transmit line, no entry field will be designated as the *transmit-upon-entry* field.

A value of **0** (zero) disables this feature. A value of **24** will cause the *last* entry field on each application screen to be defined as *transmit-upon-entry*.

AIAG

This parameter provides auto-locate and fill for input coming from bar code readers. When bar code data is entered at a terminal, the terminal searches for "AIAG" fields on the current page that can accept the bar code data. The data preloaded into the "AIAG" field by the application program determines whether or not the bar code data is accepted.

At the 9150 mini-controller, a decimal value of an ASCII character from **0** to **127** is set to match the "AIAG Field Identifier" set at the host. A value of **0** disables this feature.

The format of the preloaded data is as follows:

<mode> <AIAG prefix(data)>

The mode character used with the command allows for different operating modes to suit various application operations. The automatic locate and fill operation applies only to data received from a bar code reader. Descriptions of the modes and AIAG prefix are listed in the table below. **These modes are set at the host.**

Mode	Function
0	Display prefix, send prefix to host.
1	Do not display prefix, send prefix to host.
2	Display prefix, do not send prefix to host.
3	Do not display prefix, do not send prefix to host.
+4	Add 4 to above values to cause transmit to host when all AIAG fields with 4 set are filled. Function 0 is "pressed" if there are any fields with this bit set, and all fields with this bit set have been filled by operator input.
+8	Add 8 to above values to allow overwrite of previously entered data.
+16	Add 16 to above values to indicate cursor position priority for search and fill.
AIAG Prefix (data)	The text to be matched in the AIAG field.

Table 6.3 Mode Functions And AIAG Prefix Description

Example:

The information in the sample screen below is defined at and sent *from* the host. It includes the "AIAG Identifier" – the tag identifying this as an AIAG field – followed by the mode, in this case Mode 0, and finally, the "AIAG Prefix" – I.

AIAG Information From Host

AIAG Field Identifier

AIAG Prefix (data)

Item No.   @   OI
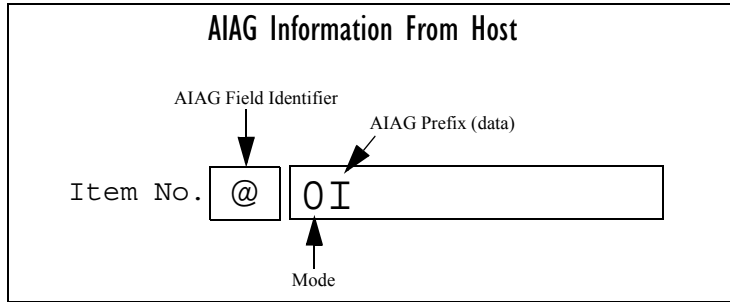
Mode

Figure 6.7 AIAG Field Sent From The Host

When the information arrives at the terminal screen, the appropriate AIAG field for the scanned information is located using the "AIAG Identifier". Because Mode 0 was set at the host, the "AIAG Prefix" – I – is displayed on the terminal screen, and when this screen is completed, the prefix will be sent back to the host.

AIAG Information From Host To Terminal Screen

AIAG Field Identifier

Item No.   @   I

AIAG Prefix (data)
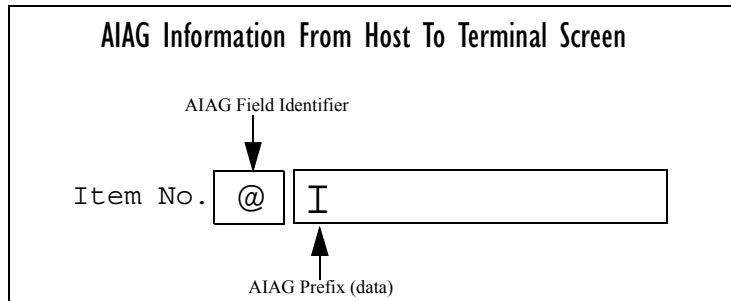
Figure 6.8 AIAG Field Sent To The Terminal

Visible Match Character

By inserting a special ASCII character directly before an entry field, the application program distinguishes a "match field" from an entry field. For example, suppose an angle bracket "**>**" is defined for visible match fields. Inserting "**>**" immediately preceding the entry field identifies it as a match field, as illustrated below.

Part #> _____

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** disables this feature. The ASCII decimal value entered at the 9150 must coincide with the value set by the application program.

To use the *Visible Match* feature, the host computer preloads data into a match entry field; the data is visible on the terminal screen. The preloaded data sent to a terminal can consist of exact characters, special match characters or a combination of the two. Refer to the table below for match characters recognized by Teklogix terminals.

If an entry does not match the preloaded data, the entry is displayed, the terminal beeps, and the cursor moves to the first position in the match field. The operator can either make another entry in the match field, or move the cursor to a new field. When an entry (even one that doesn't match the preloaded data) is made in a match field, the entry is sent to the host as part of the terminal's modified data during the next transmission.

Character	Description
#	Match a number.
&	Match a letter (either case).
^	Match an uppercase letter.
_	Match a lowercase letter.
|	Match an alphanumeric character.
"	Match a letter, number or space.
?	Match a punctuation character.
'	Match any character.
:	Match all character positions in the field with the preceding character.
;	Match any remaining characters, but not necessarily the remainder of the field, with the preceding character.

Table 6.4 Match Characters

Example:

Suppose you want to preload an entry field with a part number. If the part number is known, you can preload the field with that part number. If more flexibility is needed, and the part number always begins with two alphabetic characters followed by a hyphen and four digits, the match string for the field would be: `&&-####` .

Hidden Match Character

Unlike data in a "visible match" field, the preloaded data in a "hidden match" field is *not* displayed at the terminal.

Note: *Refer to "Visible Match Character" on page 181 for detailed information about field matching.*

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** disables this feature. The ASCII decimal value entered at the 9150 must coincide with the value set by the application program.

Serial I/O

Serial I/O fields are special entry and fixed fields that accept input from and output to a serial port. The application program distinguishes this field as *Serial I/O* by preceding the field with a special character.

If this character precedes a fixed field, the data will be sent to the terminal's serial port. If it precedes an entry field, the field accepts data from the terminal's serial port.

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** (zero) disables this feature.

Print Line

This parameter allows you to enter the starting line number of the print page in the application screen. A value of **1** causes the display page to be printed; a value of **0** (zero) disables this feature.

Print Form Length

This parameter sets the printer's form length in lines. The range is **0** to **24**.

Barcode

Barcode-input-only fields are special entry fields that only accept input from a bar code reader. The application program distinguishes an entry field as *barcode-input-only* by preceding the field with a special character.

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** (zero) disables this feature.

Entry Line

This parameter contains the number of the first line displayed if there is no entry field in the upper-left portion of the screen, and if an entry field is at or below this line.

The *Entry Line* parameter allows an automatic offset within the host screen, so that the area displayed by the terminal includes an entry field that would normally be out of bounds. Normally, Teklogix terminals only display the upper-left corner of the application screen because of their smaller display size.

Field Overhead

This parameter contains the maximum number of characters allowed between two *fixed* fields which still allows the 9150 to join them into one field.

Sometimes the 9150 will join two adjacent fixed fields and then send them as one field. This reduces the overhead on the radio link.

For example, if two fields were 4 characters apart and this parameter was '5', then these fields would be joined into one.

Command Region

This parameter defines a region of the host screen which the 9150 will examine for the presence of reserved commands.

The four numbers in the *Command Region* textboxes represent the row and column addresses of the upper left corner and the lower right corner of the command region. The first textbox of each pair contains the row number; the second contains the column number. The range of row values is **0** to **24**; column values are **0** to **80**.

To define the last two lines of the host screen as the command region, for example, enter the values *23, 1* and *24, 80*.

Currently, the only command supported is *ALARM* (refer to page 175 for details on this command). When the word "ALARM" is placed anywhere within the command region, the 9150 will send a TESS *beep* command to the terminal.

6.4.4.2   Protocol Options

This page differs depending on the type of emulation and protocol selected in the *General Host Options* page (see page 157). The 9150 displays this version of the *Protocol Options* page when you select the emulation/protocol combination of *5250/Telnet* for this host.

Teklogix 9150: 5250 Telnet Protocol Options [host5250]

Terminal Type:	IBM-5251-11
Host Port:	23
Maximum Sessions per Terminal:	4
First Local Terminal Port:	0
Local IP Address to Bind:	0.0.0.0
First Terminal Listen Port:	0
Actively Negotiate with Host:	☐
Negotiate Virtual Device Name with host (provide prefix below):	☐
Virtual Device Name prefix:	
Auto-telnet:	DISABLE
Auto-telnet Host:	

OK   Cancel

Terminal Type

This parameter allows you to choose the type of terminal to be emulated by the 9150 for this host. At present there are two choices of terminal for *5250/Telnet*: the **IBM 5251-11** and **IBM 5555-B01**.

Host Port

This parameter allows you to enter a host port value for the selected *5250/Telnet* host connection. The default value is **23**.

Maximum Sessions per Terminal

This parameter contains the maximum number of telnet sessions which are allowed to originate from each terminal. The range is **0** to **127**, with a default value of **4**.

First Local Terminal Port

This parameter contains the local port number from which the first terminal will connect on outbound telnet sessions. The default value is **0**.

Local IP Address to Bind

This parameter contains the IP address of the network adaptor from which the first terminal will connect on outbound telnet sessions.

First Terminal Listen Port

This parameter specifies the first port number at which the 9150 will listen for telnet connection requests to the terminals. To **enable** this parameter, the value must be a minimum of **1024**. To **disable** the listen port, the value must be **0**.

The default value is **0** (disabled).

Actively Negotiate with Host

If this parameter is enabled, the 9150 starts negotiations with the host during setup of the telnet connection. Not recommended for most hosts.

Negotiate Virtual Device Name with Host

If this parameter is enabled, the 9150 negotiates with the host to obtain a virtual device name for the telnet connection.

Virtual Device Name prefix

This parameter specifies a prefix for the automatically-generated virtual device name. The device name on the host starts with the prefix, specifies the terminal (as a number), and specifies a session number (as a letter). For example, if the virtual device name prefix is TLX, the first session on terminal number 2 receives a virtual device name of TLX0002A.

The prefix must use the *SNA Type A* character set, which includes uppercase letters A-Z, numbers 0-9, and the special characters $, #, and @. Lowercase letters are accepted and translated to uppercase characters. An SNA Type A character string must not begin with a number.

Auto-telnet

This parameter enables you to disable or enable automatic connection of telnet sessions from terminals to this host.

The choices provided are: **Disable** and **Auto-telnet**. The default value is **Disable**.

When *Auto-telnet* is **disabled**, telnet sessions from the terminals to the host must be initiated manually from the terminals.

When *Auto-telnet* is **enabled**, the 9150 initiates one telnet session from each terminal whose terminal number is mapped to this host. Additional telnet sessions may be initiated from each terminal to the host, but they must be initiated manually.

When *Auto-telnet* is **enabled**, the 9150 will automatically telnet to the host, both on startup and when the session is closed.

Note: Auto-telnet sessions are only initiated for terminals which are "online" (turned on and operating properly on the Teklogix RF network).

Auto-telnet Host

This parameter contains the host name or IP address for the host to which the 9150 connects Auto-telnet sessions.

Note: A host name placed in this textbox must be "resolvable" by the 9150: the 9150 must be able to obtain an IP address for it. For example, the host name may correspond to an entry in the 9150's host table, or the 9150 may be able to query a domain-name server. Any host name which can be used at the terminal's TCP> prompt may be used here.

6.4.4.3   Function Key Mappings

This page differs depending on the type of emulation selected in the *General Host Options* page. The 9150 displays this version of the *Function Key Mapping* page when you select *5250* emulation for this host.

```
Teklogix 9150: 5250 Function Key
Mappings [host 5250]
```

F1:	F1	F14:	F14	F27:	F17		
F2:	F2	F15:	F15	F28:	F18		
F3:	F3	F16:	CLEAR	F29:	UP		
F4:	F4	F17:	PRINT	F30:	SESS		
F5:	F5	F18:	HELP	F31:	ENTER		
F6:	F6	F19:	F19	F32:	ENTER		
F7:	F7	F20:	F20	F33:	ENTER		
F8:	F8	F21:	F21	F34:	ENTER		
F9:	F9	F22:	F22	F35:	ENTER		
F10:	F10	F23:	F23	F36:	ENTER		
F11:	F11	F24:	F24	F37:	ENTER		
F12:	F12	F25:	DOWN	F38:	SELECTOR		
F13:	F13	F26:	F16	F39:	ENTER		

```
OK    Cancel
```

Function key n

The *Function Key* parameter allows you to select a code that will be sent to the host when you press a function key on the terminal. Each function key may be chosen from the same range of possible codes; however, each function key has a different default code. The default values are shown on this page.

6.4.5 ANSI/Telnet

6.4.5.1   Emulation Options

The 9150 displays this version of the *Emulation Options* page after you have
selected the *ANSI/Telnet* emulation/protocol combination for this host connection.

Teklogix 9150: ANSI Emulation Options [Host ANSI]	
Maximum Screen Size (rows x columns):	24 x 80
Host Timeout:	15
Escape Timeout:	12
Threshold:	200
Echo:	☑
Function Key Remapping:	☐
Page Saving:	☑
Page Saving consider Double Byte Characters:	☐
RLE:	☐
Convert 7 to 8 Bits:	☐
OK Cancel	

Maximum Screen Size

The *Maximum Screen Size* allows you to set the maximum required screen size in
terminals, by rows and columns. This feature ensures the optimal use of memory
when using the page saving option (see "Page Saving" on page 191).

The range is a minimum setting of **24 x 80** to a maximum setting of **60 x 132.**
The default setting is **24 x 80**.

Host Timeout

The *Host Timeout* is the interval (in *ticks*, or 60ths of a second) between bursts of
data received from the host. The range is **0** to **255**, with a default value of **15**.

If the 9150 does not receive any characters from the host after this timeout has elapsed, it assumes that the host has finished sending data and is waiting for user input (in other words, it assumes that a screen of data has been completed).

Important: *The* **Page Saving** *parameter (page 191) must be enabled in order to change the value in the* **Host Timeout** *parameter.*

Escape Timeout

The *Escape Timeout* is the length of time (in *ticks*, or 60ths of a second) that the 9150 will hold an "ESC" received from the host, and consider the next received byte to be part of an escape sequence. The range is **0** to **255**, with a default value of **12**.

When this timeout has elapsed, the host will have to send another "ESC" character to start an escape sequence.

Note: *This is especially important when an ESC is at the end of a data packet.*

Threshold

The *Threshold* is the minimum number of bytes of update data for the terminal screen which must be received from the host before the 9150 will store the screen as a new "saved page". The range is **0** to **999**, with a default value of **200**.

Important: *The* **Page Saving** *parameter (page 191) must be enabled in order to change the value in the* **Threshold** *parameter.*

Echo

If this parameter is **enabled**, the 9150 uses *"Smart" Echo*. This mode reduces the amount of data sent to the terminal by decreasing the number of radio transmissions.

Ordinarily, when a character mode application is being used, each keystroke is sent to the host in one transmission, and the character is echoed by the host in another transmission. When *"Smart" Echo* is **enabled**, the 9150 will not send the host echo to the terminals if it matches the data sent from the terminal. Thus, the number of radio transmissions is reduced.

This mode also reduces or eliminates the delay between typing a character on the keyboard and displaying the character echoed by the host. The maximum number of characters waiting for echo is **25**. Any additional characters will be sent to the host but not displayed.

Notes:

1. *This parameter also determines whether an ANSI parameter query is sent to the terminal.*

2. "Smart" Echo *also needs to be enabled at the terminal (refer to the appropriate Terminals User Manual).*

Function Key Remapping

If this parameter is **enabled**, the 9150 remaps the function keys for this host connection as defined in the Function Key Remapping page (page 199).

Page Saving

If this parameter is **enabled**, the 9150 uses page saving**,** reducing data transmitted to the terminals.

The 9150 maintains an image of each page stored at the terminal. After receiving an application screen, the 9150 tries to match the screen with a stored page. If the page is already in the terminal, the 9150 instructs the terminal to redisplay its stored copy of the page; no data need be sent across the radio link for that page. If the 9150 finds no match for the page, the complete page is sent to the terminal.

The default value is **enabled**.

Notes: When page saving is enabled, the number of saved pages is that which is set on the terminal. Refer to the appropriate Terminals User Manual for details.

If using double byte character sets, such as Chinese or Korean, please refer to the Page Saving Consider Double Byte Character *parameter, below.*

Page Saving Consider Double Byte Character

When using double byte character sets such as Chinese or Korean, *Page Saving* (see above) will allow a double byte character to be partially overwritten, which can lead to a single byte of unprintable screen data or a new unintended character made up of two halves of different characters. Also, the terminal may shift data on the screen to truncate the bad data.

When *Page Saving Consider Double Byte Character* is **enabled**, *Page Saving* will replace any orphaned double byte character half with a space to prevent modified characters and truncated data from being displayed on the terminal.

The default value is **disabled**.

Note: *This option should only be used when using double byte character sets.*

RLE

If this parameter is **enabled**, the 9150 uses run-length encoding (RLE) on the data it sends across the radio link. *RLE* compresses repeated characters going from the host to the terminal. If repeated characters are found in the data stream, the first one is sent, followed by a short escape sequence (3 or 4 characters) which tells the terminal how many times to repeat this character. In this way RLE compresses the data and decreases the total amount of radio-link traffic.

Convert 7 to 8 Bits

If this parameter is **enabled**, the 9150 converts 7-bit control sequences to their 8-bit equivalents in ANSI data streams going to the terminals. This replaces two-character escape sequences with a single equivalent character, compressing the data.

6.4.5.2   Protocol Options

This page differs depending on the type of emulation and protocol selected in the *General Host Options* page. When you select the emulation/protocol combination of *ANSI/Telnet* for this host the 9150 displays the version of the *Protocol Options* screen shown on page 193.

Teklogix 9150: ANSI Telnet Protocol Options [Host ANSI]

Terminal Type:	termVT100
Host Port:	23
Maximum Sessions per Terminal:	4
Close Host sessions on Terminal reset:	☐
First Local Terminal Port:	10000
Local IP Address to Bind:	0.0.0.0 :
First Terminal Listen Port:	0
TCP Session Request Key:	1
Session Cycle Key:	2
Last Active Session Key:	5
Auto-telnet/login Enable:	DISABLE ▼
Auto-telnet Host:	
Auto-telnet Terminal Prompt:	Press ENTER to login.
Auto-login User ID:	
Auto-login Password:	
Auto-login User ID prompt:	gin:
Auto-login Password prompt:	word:
Auto-login failed login:	incorrect
Allow TCP Sessions:	☑

OK   Cancel

Terminal Type

This parameter specifies the type of terminal to be emulated by the 9150. The characters entered in the textbox can be any ASCII string acceptable to the host, with a **maximum of 32** characters. The default value is **VT100**.

Host Port

This parameter specifies the value for the host port for the selected ANSI host connection. The default value is **23**.

Maximum Sessions per Terminal

This parameter contains the maximum number of telnet sessions which are allowed to originate from each terminal. The range is **0** to **127**, with a default value of **4**.

Close Host Sessions on Terminal Reset

When this parameter is **enabled**, and a terminal reset message is received, the Host session for that terminal number will be closed. The default value is **disabled**.

First Local Terminal Port

This parameter specifies the port number from which the 9150 attempts a telnet connection for the first terminal. The default value is **0**.

Additional telnet sessions are assigned higher port numbers.

Local IP Address to Bind

This parameter specifies the IP address of the 9150 interface that connects to this host. It is used along with the local port numbers to create a unique socket for each terminal session.

First Terminal Listen Port

This parameter specifies the first port number at which the 9150 will listen for telnet connection requests to the terminals. To **enable** this parameter, the value must be a minimum of **1024**. To **disable** the listen port, the value must be **0**.

The default value is **0** (disabled).

TCP Session Request Key

This parameter contains the decimal ASCII character code of the character which will prompt the terminal to request a new ANSI terminal session. The range is **0** to **255**, with a default value of **1**.

Session Cycle Key

This parameter contains the decimal ASCII character code of the character which will prompt the terminal to display the next ANSI terminal session. The range is **0** to **255**, with a default value of **2**.

Last Active Session Key

This parameter contains the decimal ASCII character code of the character which will prompt the terminal to display the last ANSI terminal session. The range is **0** to **255**, with a default value of **5**.

Auto-telnet/login Enable

This parameter enables you to disable or enable automatic connection of telnet sessions from terminals to this host. The choices provided are: **DISABLE**; **AUTO-TELNET**; **AUTO-TELNET/LOGIN**.

The default value is **DISABLE**.

When *Auto-telnet* is **disabled**, telnet sessions from the terminals to the host must be initiated manually from the terminals.

When *Auto-telnet* is **enabled**, the 9150 initiates one telnet session from each terminal whose terminal number is mapped to this host. Additional telnet sessions may be initiated from each terminal to the host, but they must be initiated manually.

Note: Auto-telnet sessions are only initiated for terminals which are "online" (turned on and operating properly on the Teklogix RF network).

When *Auto-telnet* and *Auto-login* are **enabled**, the 9150 initiates one telnet session from each terminal whose terminal number is mapped to this host. It then logs each session in to the host using the User ID and Password provided in this page.

Note: The User ID and Password is identical for all Auto-telnet sessions automatically logged in to this host.

Auto-telnet Host

This parameter contains the host name or IP address for the host to which the 9150 connects Auto-telnet sessions.

Note: *A host name placed in this textbox must be "resolvable" by the 9150: the 9150 must be able to obtain an IP address for it. For example, the host name may correspond to an entry in the 9150's host table, or the 9150 may be able to query a domain-name server.*

Any host name which can be used at the terminal's TCP> prompt may be used here.

Auto-telnet Terminal Prompt

This parameter contains the text presented to the user to request a login. The characters can be any ASCII string, or a numeric escape sequence presented in octal or hexadecimal digits.

An octal escape sequence takes one of the forms: \0d, \0dd, or \0ddd, where each 'd' can be any digit from 0-7. If 'ddd' is greater than decimal 256, the code value of the represented character will be the remainder of the decimal ddd/256.

A hexadecimal escape sequence takes one of the forms: \xh or xhh, where each 'h' can be any digit from 0-9, or any alpha value from a-f or A-F.

Note: **\0** *is considered a character, with a code value of 0.*

The allowable value is a **maximum of 60** characters in the line. The default is no text, just press <ENTER> to login.

Auto-login User ID

This parameter contains the user ID presented by the 9150 to the host for the Auto-login sessions. The characters can be any ASCII string acceptable to the host, with a **maximum of 32** characters.

Auto-login Password

This parameter contains the password presented by the 9150 to the host for the Auto-login sessions. The characters can be any ASCII string acceptable to the host, with a **maximum of 32** characters.

Auto-login User ID prompt

The 9150 compares the text in this textbox to the text presented to it by the host. When they match, the 9150 assumes that the host has just sent its request for a user name, and it sends the user ID specified in the *Auto-Login User ID* parameter to the host. The characters can be any ASCII string, with a **maximum of 32** characters. The default text is **gin:**.

Note: *The match string should be as short as possible, yet long enough to uniquely identify the user-ID prompt. Do not include multi-part words separated by space characters, since some hosts send out characters other than space characters to present a space on the screen.*

Auto-login Password prompt

The 9150 compares the text in this textbox to the text presented to it by the host. When they match, the 9150 assumes that the host has just sent its request for a password, and it sends the password specified in the *Auto-Login Password* parameter to the host. The characters can be any ASCII string, with a **maximum of 32** characters. The default text is **word:**.

Note: *The match string should be as short as possible, yet long enough to uniquely identify the password prompt. Do not include multi-part words separated by space characters, since some hosts send out characters other than space characters to present a space on the screen.*

Auto-login failed login

The 9150 compares the text in this textbox to the text presented to it by the host. When they match, the 9150 assumes that the host has just sent a string informing the terminal of a failed login attempt. The 9150 then presents the *Auto-telnet Terminal Prompt* on the terminal's screen to request the user to login manually. The characters can be any ASCII string, with a **maximum of 32** characters. The default text is **incorrect**.

Note: *The match string should be as short as possible, yet long enough to uniquely identify the failed-login prompt. Do not include multi-part words separated by space characters, since some hosts send out characters other than space characters to present a space on the screen.*

Allow TCP Sessions

When this parameter is **enabled**, the 9150 allows a terminal user to switch prompts or sessions while at the prompt (either Auto-login or TCP). If *Allow TCP Sessions* is **disabled**, all new sessions will open as Auto-login sessions.

Requesting sessions (normally <CTRL> *a* on the terminal) can be used at the prompt level to change the type of prompt (if the other type of prompt is available).

Switching sessions at the prompt level is also available (on the terminal as <CTRL> *b* [next session], or <CTRL> *e* [last session]). When switching sessions at the prompt, the terminal state (not logged in) will be correctly adjusted to match that of the switching in session.

The default value is **enabled**.

6.4.5.3   Function Key Mappings

This page differs depending on the type of emulation selected in the *General Host Options* page. The 9150 displays this version (page 200) of the *Function Key Mapping* page after you have selected the *ANSI/Telnet* emulation/protocol combination for the host connection.

Teklogix 9150: ANSI Function Key Mappings [hostansi]

F1:	1b,4f,50,00,00,00,00,00
F2:	1b,4f,51,00,00,00,00,00
F3:	1b,4f,52,00,00,00,00,00
F4:	1b,4f,53,00,00,00,00,00
F5:	1b,5b,31,36,7e,00,00,00
F6:	1b,5b,31,37,7e,00,00,00
F7:	1b,5b,31,38,7e,00,00,00
F8:	1b,5b,31,39,7e,00,00,00
F9:	1b,5b,32,30,7e,00,00,00
F10:	1b,5b,32,31,7e,00,00,00
F11:	1b,5b,32,33,7e,00,00,00
F12:	1b,5b,32,34,7e,00,00,00
F13:	1b,5b,32,35,7e,00,00,00
F14:	1b,5b,32,36,7e,00,00,00
F15:	1b,5b,32,38,7e,00,00,00
F16:	1b,5b,32,39,7e,00,00,00
F17:	1b,5b,33,31,7e,00,00,00
F18:	1b,5b,33,32,7e,00,00,00
F19:	1b,5b,33,33,7e,00,00,00
F20:	1b,5b,33,34,7e,00,00,00
F21:	1b,5b,31,7e,00,00,00,00
F22:	1b,5b,32,7e,00,00,00,00
F23:	1b,5b,33,7e,00,00,00,00
F24:	1b,5b,34,7e,00,00,00,00
F25:	1b,5b,35,7e,00,00,00,00
F26:	1b,5b,36,7e,00,00,00,00
F27:	1b,5b,34,31,7e,00,00,00
F28:	1b,5b,34,32,7e,00,00,00
F29:	1b,5b,34,33,7e,00,00,00
F30:	1b,5b,34,34,7e,00,00,00

OK   Cancel

Function key n

The *Function Key* parameter allows you to select a code that will be sent to the host when you press a function key on the terminal. Each function key may be chosen from the same range of possible codes; however, each function key has a different default code. The default values are shown on the screen above.

6.4.6 RF Modem/Telnet

RF Modem/Telnet is intended for a controller communicating with a Teklogix Model 6040 RF Modem. The 6040 acts as a terminal on the Psion Teklogix network to allow serial devices to communicate over that network (see the *6040 RF Modem User Manual* for details). Since the 6040 simply passes serial data through to connected serial devices, there are no emulation or function key options. The 9150 displays this version of the *Host Menu* page after you have selected the *RF Modem/Telnet* emulation/protocol combination for this host connection.

6.4.6.1 Emulation Options

These parameters are not applicable to the RF Modem emulation.

6.4.6.2 ANSI Telnet Protocol Options (RF Modem)

This page differs depending on the type of emulation and protocol selected in the *General Host Options* page. The 9150 displays this version of the *Protocol Options* page for the emulation/protocol combination *RF Modem/Telnet* for this host.

First Terminal Listen Port

This parameter specifies the first port number at which the 9150 will listen for telnet connection requests to the terminals. To **enable** this parameter, the value must be a minimum of **1024**. To **disable** the listen port, the value must be **10000**. The default value is **10000** (disabled).

6.4.6.3   Function Key Mappings

These parameters are not applicable to the RF Modem emulation.

6.5   802.IQ V2 Features Menu

This parameter accesses the 802.IQv2 sub-menu that enables the Psion Teklogix proprietary 802.11b enhanced protocol, as described in "Psion Teklogix' 802.IQ Protocol" on page 9. For detailed configuration information on 802.IQv1, please refer to "802.IQ Version 1 Configuration Menu" on page 68.

6.5.1   802.IQ Version 2 Configuration

802.IQ is a Psion Teklogix proprietary optimized protocol that enables terminals to operate on a wireless LAN in a network that supports both TCP/IP and 802.IQ protocol simultaneously. 802.IQ protocol is available in two versions: 802.IQv1 and 802.IQv2. The 9150 can support both versions of the protocol at the same time; terminals must use only one.

802.IQv1 protocol is a wireless LAN protocol that provides greater performance in an 802.11b wireless network than is possible with TCP/IP. The 9150 bridges the 802.IQv1 wireless and TCP/IP wired networks.

802.IQv2 protocol is an enhanced version of the 802.IQv1 protocol that transports packets over the UDP layer. It provides all the 802.IQv1 functionality, with the added features of software upgrade capability over RF, the ability to add third-party access points between controllers and terminals, and integration into the mapRF system, if desired.

Important: 802.IQ should only be enabled on wired 9150s.

Do not configure 802.IQ on wired 9150s bridging networks, since 802.IQ beacons would be sent through the WDS link from one network to the other (see "Wireless Distribution System (WDS) Configuration" on page 76).

The *802.IQ Version 2 Configuration* page is entered from the *802.IQ v2 Features* menu on the main web page, under Mini-Controller Configuration.

6.5.1.1 802.IQ v1/v2 Common Features

Auto Startup

This parameter **enables** (√) 802.IQ immediately when the 9150 is rebooted. When the 9150 is operating as a base station under a network controller or a 9150 mini-controller, this parameter must be **disabled**. The default value is **disabled**.

⚠️ *Important:*   If **Auto Startup** *is set incorrectly, terminals may not operate correctly.*

Beacon Period

An 802.IQ beacon is a broadcast sent out to all 802.IQ-enabled terminals. The beacon allows terminals to determine when they have roamed between base stations. It enables a terminal to determine whether or not the base station or controller was rebooted and, if so, how to recover. If the controller was rebooted, the terminal closes all sessions and fully re-initializes. If the base station was rebooted, or if the terminal moved to a different 9150, a warm initialize is done (no data will be lost).

The *Beacon Period* parameter acceptable value ranges from **1** to **20** seconds. The default value is **2**.

Terminal Offline Timeout

This parameter sets the time (in minutes) before the 802.IQ task on the 9150 will send an offline message to the cellular master declaring the terminal offline.

The acceptable value ranges from **1** to **240**. The default value is **5**.

6.5.1.2   802.IQ v2 Configuration Sub-Screen

Enabled

This parameter enables (√) or disables the 802.IQv2 protocol.

The default value is **disabled**.

Beacon UDP Port

This parameter identifies the UDP port for beacon broadcasts. If more than one 802.IQv2 controller is on the network, the parameter must be changed to separate the systems. The parameter must also match the corresponding parameter on the terminal. The range of values is **5001** to **65535**. The default value is **8888**.

Beacon Gateway Interface

This is the interface on which the beacons are sent out.

The default is **[1] 10BaseT Ethernet**.

9100 MONITORING/DIAGNOSTICS 7

7.1 Fault Monitoring

Once power to a port is applied, the microcontroller enters a fault monitoring mode. The diagnostic functions are:

- Low current condition
- High current condition
- Power Monitoring (conducted regardless of port state)

7.1.1 Low Current Detection

The microcontroller continuously checks ports in the "ON" state to determine if each/any is in an under-current condition (this will typically happen when the Ethernet cable is disconnected or some other fault occurs). This ensures that a powered cable, when disconnected from a powered device, cannot be reconnected into some other device, possibly causing damage to a non-compliant device.

If a Low Current condition is detected, then the power to the port is turned off. This process is carried out for each of the four ports during fault monitoring. Following a Low Current detection, the 9100 starts the discovery process again after a two-second delay.

This fault is indicated by a slowly flashing yellow LED. After a two-second delay, the 9100 will start the resistor detection again.

7.1.2 High Current Detection

Once a port is enabled, a sense voltage is measured periodically by the microcontroller to ensure that it remains less than the maximum allowed voltage, otherwise an over-current fault occurs. A maximum continuous current of up to 350 mA is allowed. To allow for inrush currents, which may occur when a powered device is first connected (or the presence of a short or surge on the line), a hardware current-limiting circuit ensures fail-safe output power control during the first 100mS following port power-ON. Subsequently, the microcontroller will turn the port power OFF immediately upon detection of an overcurrent condition.

Note: There is a five-second safety period before the 9100 begins resistor detection on a port that has triggered the overcurrent detection.

7.1.3   Power Monitoring

The 9100 power monitoring circuit constantly checks the operating condition of the internal power supply. If the power goes out of range, all ports are turned off, and all LEDs will be in Fast blink mode.

7.2   Diagnostics and Status Reporting

The 9100 PowerBaseT console port consists of a UART port on the microcontroller, RS232 transceiver (U7) and a DB9 connector. Detailed information and the DB9 connector pinout is given on page B-4. The DB9 connector is used for the following functions:

- Report Status   Using a PC and HyperTerminal.

- Programming/Download   Supports code updates by Field Service personnel.

The microcontroller is required to provide the following functions:

- Maintain port status   Port off, Port on, fault

- Maintain port control   Port enabled, Port disabled

- Report power consumption   Monitor current flow using the current sensing circuit.

The information in Figure 7.1 on page 209 is output on the console port every second. The frequency at which this information is updated is adjustable via a console command input. It can be set anywhere from never to 65,535 seconds, in one-second increments. Serial port settings are 19,200 baud, no parity, 8 data bits, 1 stop bit.

Note: High and Low Current Detection:

A fault condition will be indicated by the LEDs and on the console until the fault is cleared, either by the resistor detection for that port succeeding and the port being switched ON, or disabling and re-enabling the port from the console.

```
      9100 PowerBaseT - Build¹: D161o
      Main supply: Good²
      Port 1: Disabled current: 0 mA
      Port 2: Off current: 0 mA
      Port 3: On current³: 78 mA
      Port 4: High Current⁴: current 0 mA
      >⁵
```

[1] Firmware build date.

[2] Could also read "Bad".

[3] Current consumed by an active port.

[4] Possible states: **Disabled**
                    Off
                    On
                    Low Current
                    High Current

[5] Input prompt.

Figure 7.1 Annotated Console Information Screen

The possible states for any one port, as listed in Figure 7.1, are described below:

Disabled

Disabled in software via the console port. The port is inactive and will remain in this state until it is enabled via the console, or the 9100 is reset. When the port is activated, it transitions to the **OFF** state.

OFF

In this state the 9100 is constantly performing the auto-detect algorithm, looking for 9150DCs connected to the port. When a 9150DC is found, the port will transition to the **ON** state.

ON

A 9150DC has been found, and DC power is switched on. The port is constantly monitored for fault conditions. If everything remains within operating specification, the port will remain in the **ON** state. Fault conditions may transition the port to the **Low Current fault** or **High Current fault** state.

Low Current fault

A 9150DC that was previously being powered on this port has either been disconnected, or is not operating correctly. The 9100 will remove power from the port and remain in this state for a minimum of two seconds before transitioning to the **OFF** state. The port will continue to indicate the Low Current fault until it either transitions to the ON state, or is disabled via the console.

High Current fault

A 9150DC that was previously being powered on this port is drawing too much current from the 9100, or there is a short in the connecting cabling. The 9100 will remove power from the port and remain in this state for a minimum of five seconds before transitioning to the **OFF** state. The port will continue to indicate the High Current fault until it either transitions to the ON state, or is disabled via the console.

SPECIFICATIONS 8

Note: *Performance specifications are nominal and subject to change without notice.*

8.1 Specifications For The 9150 Wireless Gateway

8.1.1 Physical Description

Enclosure		Bayer Makroblend EL-700 (PC/PET blend), jet black in colour, texture to MT-11030 or equivalent
Dimensions	Nominal	36.3 x 26.2 x 7.4 cm (14.3 x 10.3 x 2.9 in.)
	Maximum	36.8 x 26.7 x 7.6 cm (14.5 x 10.5 x 3.0 in.)
Weight	Nominal	2.9 kg (6.5 lbs.)
	Maximum	3.2 kg (7.0 lbs.)

8.1.2 9150T Power Requirements

Input voltage	100 - 240 V
Frequency	50/60 Hz
Current	1.0 A

Warning: **To avoid electric shock, the power cord protective grounding conductor must always be connected to ground.**

8.1.3 9150DC Power Requirements

Input voltage	48 V DC nominal
Current	250 mA maximum

Warning: **A ground wire, not exceeding 3 m in length, must be connected between the ground screw (adjacent to the Auz.48V jack) and a suitable earth ground bonding point.**

8.1.4 Processor And Memory

9150T Wireless Gateway: Power PC 860T, 50 MHz Processor
9150DC Wireless Gateway: Power PC 860T, 50-60 MHz Processor
16 MB DRAM
2 MB Flash ROM

8.1.5 Environmental Requirements

Operating Temperature	0°C to 50°C (32°F to 122°F)
Operating Rel. Humidity	10% to 90% (Non-condensing)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Dust and Rain	IEC 529 IP42

8.1.6 Network Interfaces

9150DC Wireless Gateway

On-Board Ethernet	10BaseT/100BaseT (10/100 Mb/s) card Data rate is auto-sensed.

9150T Wireless Gateway

On-Board Ethernet	10BaseT/100BaseT (10/100 Mb/s) card Data rate is auto-sensed.

8.1.7 PC Card Radios

Important: ***For sites in Canada, Lucent WaveLAN 802.11 radios require a radio licence, unless they are installed totally within a building. (The user shall obtain this licence from Industry Canada.)***

TRX7370 Narrow Band DSP

Transmit Power	2.0 W (North America)
	0.5 to 2.0 W (International)
Frequency Range	403 to 512 MHz
Data Rate	4800, 9600, 19200 b/s
(dependent on modulation and frequency)	
No. of Channels	20

TekLAN 902 MHz DS Spread Spectrum (TRX7410)

Transmit Power	0.25 W (United States)
	1.0 W (Canada and Australia)
Frequency	902 MHz
Data Rate	122 kb/s
No. of Channels	7

Lucent WaveLAN IEEE 802.11 2.4 DSSS GHz (TRX7431)*

Transmitter Power	32 mW
Frequency Range	2.4 to 2.4835 GHz
Data Rate	1, 2, 5.5, 11 Mb/s
No. of Channels	11 (FCC)
	4 (FR)
	2 (SP)
	13 (ETSI)

* For regulatory information concerning the Lucent WaveLAN PC Card, please see page 217.

8.1.8 Approvals

FCC Part 15, subpart B, Class B
Electrical Safety: CSA/NRTL, TÜV, CB Scheme

ETS 300 113	ETS 300 220
ETS 300 086	ETS 300 328

CE Mark:	EN 55022: 1998
	EN 55024: 1998

8.2   Specifications For The 9100 PowerBaseT

8.2.1   Physical Description

Enclosure	12, 16, and 18 gauge steel with baked enamel finish
Dimensions	48.3 x 18.1 x 4.3 cm (19 x 7.1 x 1.7 in.)
Weight	2.45 kg (5.4 1bs)

8.2.2   Power Requirements

Universal AC/DC power supply:

Input Voltage:	100 - 240 V AC 50-60 Hz
Input Current:	1.4 A - 0.6 A
Output Voltage:	48 V DC +/- 2%
Output Power:	60 W

This power supply delivers 13 Watts per port for a total of 52 Watts. Power supplied to each port is protected by over-voltage and current-limiting within the power supply.

Warning: ***To avoid electric shock, the power cord protective grounding conductor must always be connected to ground.***

8.2.3   Network Interface

For each of Ports 1, 2, 3, and 4:

On-Board Ethernet	The "Data" connector is patched to the Ethernet backbone or switch/hub.
	The "Data + 48V" connector is wired directly to the 9150DC.

Note: *The 9100 has no effect on the data passed through it. 48VDC is inserted on the spare pins/conductors of the cable to the 9150DC.*

8.2.4   Electrical Safety Approvals

CSA/NRTL/C and CB certificate

8.3 Lucent/Agere WaveLAN PC Card Regulatory Information

The IEEE 802.11 WaveLAN PC Card must be installed and used in strict accordance with the manufacturer's instructions. This device complies with the following radio frequency and safety standards.

Canada - Industry Canada (IC)

This device complies with RSS 210 of Industry Canada.

Europe - EU Declaration of Conformity

This device complies with the specifications listed below, following the provisions of the EMC Directive 89/336/EEC:

- ETS 300-826 General EMC requirements for Radio equipment.

- ETS 300-328 Technical requirements for Radio equipment.

USA - Federal Communications Commission (FCC)

This device complies with Part 15 of FCC Rules. Operation of the devices in a WaveLAN System is subject to the following two conditions:

- This device may not cause harmful interference.

- This device must accept any interference that may cause undesired operation.

Important: ***Exposure to Radio Frequency Radiation.***

> *The radiated output power of the IEEE 802.11 WaveLAN PC Card is far below the FCC radio frequency exposure limits. Nevertheless, the WaveLAN PC Card shall be used in such a manner that the potential for human contact during normal operation is minimized. When using this device in combination with WaveLAN Outdoor Antenna products, a certain separation distance between antenna and nearby persons has to be kept to ensure RF exposure compliance. Refer to the Regulatory Statements as identified in the documentation that comes with those products for additional information.*

Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the distance between the equipment and the receiver.

- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Lucent/Agere Technologies is not responsible for any radio or television interference caused by unauthorized modification of the devices included with this IEEE 802.11 WaveLAN Kit, or the substitution or attachment of connecting cables and equipment other than specified by Lucent/Agere Technologies.

The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

For country-specific approvals, please consult the flyer "Radio Certification Information" that is included with the 9150 Wireless Gateway.

APPENDIX A

SUPPORT SERVICES AND WORLDWIDE OFFICES

A.1 Support Services

Psion Teklogix provides a complete range of product support services to its customers worldwide. These services include post-installation technical support and product repairs.

A.1.1 Canada and U.S.A: Technical Support and Repair Services

In Canada and the U.S.A. these services can be accessed through the Psion Teklogix Helpdesk. The Helpdesk coordinates repairs, helps you troubleshoot problems over the phone, and arranges for technicians or engineers to come to your site.

Canadian and U.S. customers may receive access to technical support services, ranging from phone support to emergency on-site system support, by calling the toll-free number below, or via our secure web site.

Note: *Customers calling the toll-free number should have their Psion Teklogix customer number or trouble ticket number available.*

Voice: 1 800 387-8898

Fax: 1 905 812-6304

Web Site: http://service.psionteklogix.com

A.1.2 International Support

For technical support outside of Canada or the U.S.A., please contact your local Psion Teklogix office. See page A-3 for a listing of worldwide offices.

A.2 WORLDWIDE OFFICES

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A.3 WORLDWIDE WEB

www.psionteklogix.com

APPENDIX B

PORT PINOUTS AND CABLE DIAGRAMS

B.1 Console Port

Pin No.	Name	Function	Direction
3	TD	Transmit Data	Out
2	RD	Receive Data	In
5	SG	Signal Ground	–
4*	DTR	Data Terminal Ready	Out
7*	RTS	Request to Send	Out

* always pulled high

B.2 Serial Cable Descriptions

Cable No.	Function	Connection	Standard Length
19387	9150 to Console	Direct	6 feet

Console Port Cable No. 19387
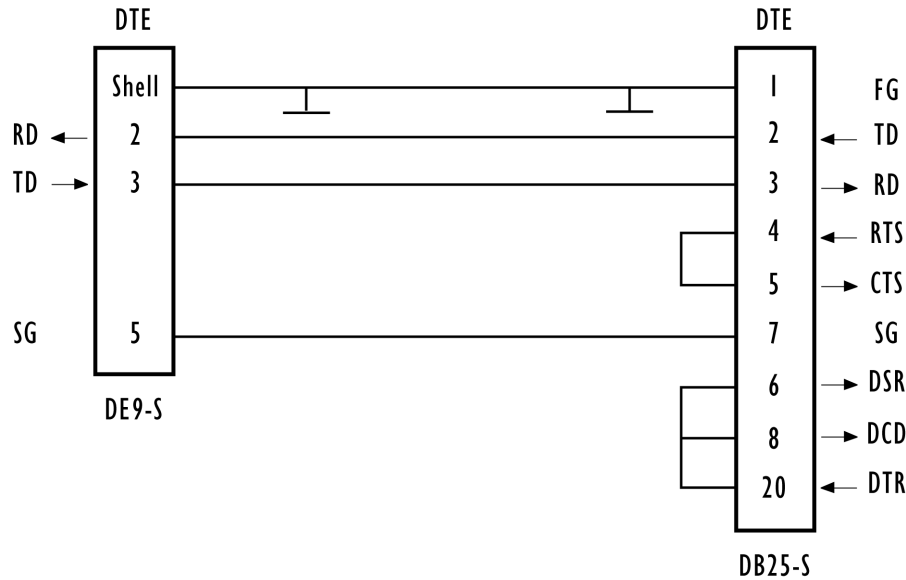
B.3 RJ-45 Connector Pinouts (10BaseT/100BaseT Ethernet)
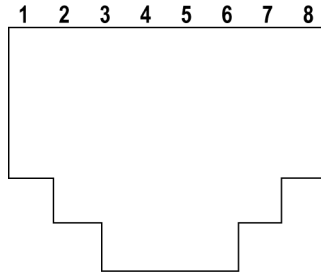
9150T		9150DC*		9100 PowerBaseT	
Contact	Signal	Contact	Signal	Contact	Signal
1	TD+	1	TD+	1	TD+
2	TD−	2	TD−	2	TD−
3	RD+	3	RD+	3	RD+
4	Not used	4	+48 VDC In	4	+48 VDC Out
5	Not used	5	+48 VDC In	5	+48 VDC Out
6	RD−	6	RD−	6	RD−
7	Not used	7	48 VDC Return In	7	48 VDC Return Out
8	Not used	8	48 VDC Return In	8	48 VDC Return Out
		* The 9150DC can also accept 48 VDC power bias on the data line pairs (1,2) and (3,6) from such systems providing power over Ethernet.			

Note: *Usually, a straight-through connection is needed to connect Twisted-Pair (10BaseT or 100BaseT) to the hub.*

Important: **For Main Logic Board (MLB) P/N 30183-301 Rev F only: When connecting the RJ-45 Ethernet cable to the 9150T (AC power version), ensure that the snap-on ferrite for cables (P/N 97776) is placed on the cable as closely as possible to the RJ-45 jack. To determine which version of the MLB is resident in your 9150, please contact Psion Teklogix Support Services (see page A-1).**

B.4 9100 PowerBaseT Console Port Pinout

The 9100 PowerBaseT console port consists of a UART port on the microcontroller, RS232 transceiver (U7) and a DB9 connector (J16) pins 2 (RXD), 3 (TXD) and 5 (GND). The same connector (J16) is used to connect the Programmer to the 9100 PowerBaseT.

Note: *Programming equipment for Field Service use:*
Programmer (P/N 21297)
Cable, Programmer to 9100 (P/N 98109)
Cable, Programmer to PC (P/N 19687)

The DB9 connector pins 1, 4, 5, 6, and 9 are used during the programming/download phase. The DB9 connector pinout is given in the table on page B-5, with the Function field describing the function performed by each pin (Programming/Download or Console).

The DB9 connector is used for the following functions:

- Report Status   Using a PC and HyperTerminal.

- Programming/Download   Supports code updates by Field Service personnel.

The microcontroller features a full duplex (separate receive and transmit registers) UART with baud generator, 8 or 9 data bits, noise filtering, overrun detection, framing error detection, and interrupts. The transceiver is 5 V powered with two drivers and two receivers with extra protection against ESD.

9100 PowerBaseT Console Port Pinout Table

PIN#	Signal Name	Function	Description
1	PROGRAM_DATA_IN	Programming/ Download	Data Input from the programmer
2	RXD	Console	Serial Data Input
3	TXD	Console	Serial Data Output
4	PROGRAM_DATA_OUT	Programming/ Download	Data Output to the programmer
5	GND	Console and Programming/ Download	Ground
6	PROGRAM_CLOCK	Programming/ Download	Clock Input from the programmer
7	NC		
8	NC		
9	PROGRAM_EN	Programming/ Download	Programming enable

APPENDIX C

MAC BRIDGE PROTOCOL FILTERS AND OUIS

C.1 Ethernet II Types (RFC 1700)

C.1.1 Listing by Description

DESCRIPTION	TYPE (HEX VALUES)
3Com Corporation	0x6010-0x6014
3Com(Bridge) loop detect	0x9003
3Com(Bridge) TCP-IP Sys	0x9002
3Com(Bridge) XNS Sys Mgmt	0x9001
Advanced Encryption System	0x823E-0x8240
Aeonic Systems	0x8036
Allen-Bradley	0x80E0-0x80E3
Alpha Micro	0x814A
Apollo Computer	0x80F7
Apollo Computers	0x8019
Appletalk	0x809B
AppleTalk AARP (Kinetics)	0x80F3
Applitek Corporation	0x80C7
Apricot Computers	0x81CC-0x81D5
ARAI Bunkichi	0x81A4
ARP	0x0806
Artisoft	0x81D6-0x81DD
Ascom Banking Systems	0x8221-0x8222

DESCRIPTION	TYPE (HEX VALUES)
AT&T	0x8008
AT&T	0x8046
AT&T	0x8047
AT&T	0x8069
Athena Programming	0x827F-0x8282
ATOMIC	0x86DF
Autophon	0x806A
Banyan Systems	0x0BAD
Banyan Systems	0x80C4
Banyan Systems	0x80C5
BBN Simnet	0x5208
BBN VITAL-LanBridge cache	0xFF00
Berkeley Trailer encap/IP	0x1001-0x100F
Berkeley Trailer nego	0x1000
BIIN	0x814D
BIIN	0x814E
Bridge Communications	0x8132-0x8136
Cabletron	0x7034
Chaosnet	0x0804
Charles River Data System	0x8164-0x8166
Charles River Data System	0x8263-0x826A
ComDesign	0x806C
Computer Network Tech	0x869E-0x86A1
Computer Protocol Pty Ltd.	0x815C-0x815E
Computgraphic Corp.	0x806D
Comsat Labs	0x81F0-0x81F2

DESCRIPTION	TYPE (HEX VALUES)
Counterpoint Computers	0x8062
Counterpoint Computers	0x8081-0x8083
Cronus Direct	0x8004
Cronus VLN	0x8003
Dansk Data Elektronik	0x807B
Datability	0x809C-0x809E
Datability	0x80E4-0x80F0
DCA Data Exchange Cluster	0x80C0-0x80C3
DEC Customer Protocol	0x6006
DEC DECNET Phase IV Route	0x6003
DEC Diagnostic Protocol	0x6005
DEC Ethernet Encryption	0x803D
DEC LAN Traffic Monitor	0x803F
DEC LANBridge	0x8038
DEC LAT	0x6004
DEC LAVC, SCA	0x6007
DEC MOP Dump/Load	0x6001
DEC MOP Remote Console	0x6002
DEC Unassigned	0x6008-0x6009
DEC Unassigned	0x8039-0x803C
DEC Unassigned	0x803E
DEC Unassigned	0x8040-0x8042
DEC Unassigned (Exp.)	0x6000
Delta Controls	0x86DE
DLOG	0x0660
DLOG	0x0661

DESCRIPTION	TYPE (HEX VALUES)
ECMA Internet	0x0803
Evans & Sutherland	0x805D
Excelan	0x8010
ExperData	0x8049
Gateway Communications	0x86A3-0x86AC
General Dynamics	0x8068
Harris Corporation	0x80CD-0x80CE
Hayes Microcomputers	0x8130
HP Probe	0x8005
IBM SNA Service on Ether	0x80D5
Idea Courier	0x8694-0x869D
Inst Ind Info Tech	0x829A-0x829B
Integrated Solutions TRFS	0x80DE-0x80DF
Intergraph Corporation	0x80C8-0x80CC
Internet IP (IPv4)	0x0800
Invisible Software	0x8A96-0x8A97
ISC Bunker Ramo	0xFF00-0xFF0F
Kinetics	0x80F4-0x80F5
KTI	0x8139-0x813D
Landis & Gyr Powers	0x86E0-0x86EF
Landmark Graphics Corp.	0x806E-0x8077
Little Machines	0x8060
Logicraft	0x8148
Loopback	0x9000
LRT	0x7020-0x7029
Matra	0x807A

DESCRIPTION	TYPE (HEX VALUES)
Merit Internodal	0x807C
Motorola	0x8700-0x8710
Motorola Computer	0x818D
NBS Internet	0x0802
Nestar	0x8006
Network Computing Devices	0x8149
Nixdorf Computers	0x80A3
Novell, Inc.	0x8137-0x8138
Pacer Software	0x80C6
PCS Basic Block Protocol	0x4242
Planning Research Corp.	0x8044
Polygon	0x81E6-0x81EF
Proteon	0x7030
Protocol Engines	0x817D-0x818C
PUP Addr Trans	0x0A01
Qualcomm	0x8151-0x8153
Qualcomm	0x819A-0x81A3
Quantum Software	0x8203-0x8205
RAD Network Devices	0x81A5-0x81AE
Rational Corp	0x8150
Retix	0x80F2
Reverse ARP	0x8035
Rosemount Corporation	0x80D3-0x80D4
SAIC	0x81F3-0x81F5
SECTRA	0x86DB
SGI bounce server	0x8016

DESCRIPTION	TYPE (HEX VALUES)
SGI diagnostics	0x8013
SGI network games	0x8014
SGI reserved	0x8015
Siemens Gammasonics Inc.	0x80A4-0x80B3
SNMP	0x814C
Spider Systems Ltd.	0x809F
Stanford V Kernel exp.	0x805B
Stanford V Kernel prod.	0x805C
Symbolics Private	0x081C
Symbolics Private	0x8107-0x8109
Taurus Controls	0x829C-0x82AB
Taylor Instrument	0x80CF-0x80D2
Technically Elite Concept	0x814F
Tigan, Inc.	0x802F
Tymshare	0x802E
Ungermann-Bass dia/loop	0x7002
Ungermann-Bass download	0x7000
Ungermann-Bass net debugr	0x0900
Univ. of Mass. @ Amherst	0x8065
Univ. of Mass. @ Amherst	0x8066
Valid Systems	0x1600
Varian Associates	0x80DD
Veeco Integrated Auto.	0x8067
VG Analytical	0x81F6-0x81F8
VG Laboratory Systems	0x8131
Vitalink Communications	0x807D-0x807F

DESCRIPTION	TYPE (HEX VALUES)
Vitalink TransLAN III	0x8080
Walker Richer & Quinn	0x82AC-0x8693
Wellfleet Communications	0x80FF-0x8103
X.25 Level 3	0x0805
X.75 Internet	0x0801
Xerox IEEE802.3 PUP	0x0A00
XEROX NS IDP	0x0600
XNS Compatibility	0x0807
Xyplex	0x0888-0x088A
Xyplex	0x81B7-0x81B9

C.1.2 Listing By Type (Hexadecimal)

TYPE (HEX VALUES)	DESCRIPTION
0x0600	XEROX NS IDP
0x0660	DLOG
0x0661	DLOG
0x0800	Internet IP (IPv4)
0x0801	X.75 Internet
0x0802	NBS Internet
0x0803	ECMA Internet
0x0804	Chaosnet
0x0805	X.25 Level 3
0x0806	ARP
0x0807	XNS Compatibility
0x081C	Symbolics Private
0x0888-0x088A	Xyplex
0x0900	Ungermann-Bass net debugr
0x0A00	Xerox IEEE802.3 PUP
0x0A01	PUP Addr Trans
0x0BAD	Banyan Systems
0x1000	Berkeley Trailer nego
0x1001-0x100F	Berkeley Trailer encap/IP
0x1600	Valid Systems
0x4242	PCS Basic Block Protocol
0x5208	BBN Simnet
0x6000	DEC Unassigned (Exp.)
0x6001	DEC MOP Dump/Load
0x6002	DEC MOP Remote Console

TYPE (HEX VALUES)	DESCRIPTION
0x6003	DEC DECNET Phase IV Route
0x6004	DEC LAT
0x6005	DEC Diagnostic Protocol
0x6006	DEC Customer Protocol
0x6007	DEC LAVC, SCA
0x6008-	DEC Unassigned
0x6009	DEC Unassigned
0x6010-0x6014	3Com Corporation
0x7000	Ungermann-Bass download
0x7002	Ungermann-Bass dia/loop
0x7020-0x7029	LRT
0x7030	Proteon
0x7034	Cabletron
0x8003	Cronus VLN
0x8004	Cronus Direct
0x8005	HP Probe
0x8006	Nestar
0x8008	AT&T
0x8010	Excelan
0x8013	SGI diagnostics
0x8014	SGI network games
0x8015	SGI reserved
0x8016	SGI bounce server
0x8019	Apollo Computers
0x802E	Tymshare
0x802F	Tigan, Inc.

TYPE (HEX VALUES)	DESCRIPTION
0x8035	Reverse ARP
0x8036	Aeonic Systems
0x8038	DEC LANBridge
0x8039-0x803C	DEC Unassigned
0x803D	DEC Ethernet Encryption
0x803E	DEC Unassigned
0x803F	DEC LAN Traffic Monitor
0x8040-0x8042	DEC Unassigned
0x8044	Planning Research Corp.
0x8046	AT&T
0x8047	AT&T
0x8049	ExperData
0x805B	Stanford V Kernel exp.
0x805C	Stanford V Kernel prod.
0x805D	Evans & Sutherland
0x8060	Little Machines
0x8062	Counterpoint Computers
0x8065	Univ. of Mass. @ Amherst
0x8066	Univ. of Mass. @ Amherst
0x8067	Veeco Integrated Auto.
0x8068	General Dynamics
0x8069	AT&T
0x806A	Autophon
0x806C	ComDesign
0x806D	Computgraphic Corp.
0x806E-0x8077	Landmark Graphics Corp.

TYPE (HEX VALUES)	DESCRIPTION
0x807A	Matra
0x807B	Dansk Data Elektronik
0x807C	Merit Internodal
0x807D-0x807F	Vitalink Communications
0x8080	Vitalink TransLAN III
0x8081-0x8083	Counterpoint Computers
0x809B	Appletalk
0x809C-0x809E	Datability
0x809F	Spider Systems Ltd.
0x80A3	Nixdorf Computers
0x80A4-0x80B3	Siemens Gammasonics Inc.
0x80C0-0x80C3	DCA Data Exchange Cluster
0x80C4	Banyan Systems
0x80C5	Banyan Systems
0x80C6	Pacer Software
0x80C7	Applitek Corporation
0x80C8-0x80CC	Intergraph Corporation
0x80CD-0x80CE	Harris Corporation
0x80CF-0x80D2	Taylor Instrument
0x80D3-0x80D4	Rosemount Corporation
0x80D5	IBM SNA Service on Ether
0x80DD	Varian Associates
0x80DE-0x80DF	Integrated Solutions TRFS
0x80E0-0x80E3	Allen-Bradley
0x80E4-0x80F0	Datability
0x80F2	Retix

TYPE (HEX VALUES)	DESCRIPTION
0x80F3	AppleTalk AARP (Kinetics)
0x80F4-0x80F5	Kinetics
0x80F7	Apollo Computer
0x80FF-0x8103	Wellfleet Communications
0x8107-0x8109	Symbolics Private
0x8130	Hayes Microcomputers
0x8131	VG Laboratory Systems
0x8132-0x8136	Bridge Communications
0x8137-0x8138	Novell, Inc.
0x8139-0x813D	KTI
0x8148	Logicraft
0x8149	Network Computing Devices
0x814A	Alpha Micro
0x814C	SNMP
0x814D	BIIN
0x814E	BIIN
0x814F	Technically Elite Concept
0x8150	Rational Corp
0x8151-0x8153	Qualcomm
0x815C-0x815E	Computer Protocol Pty Ltd
0x8164-0x8166	Charles River Data System
0x817D-0x818C	Protocol Engines
0x818D	Motorola Computer
0x819A-0x81A3	Qualcomm
0x81A4	ARAI Bunkichi
0x81A5-0x81AE	RAD Network Devices

TYPE (HEX VALUES)	DESCRIPTION
0x81B7-0x81B9	Xyplex
0x81CC-0x81D5	Apricot Computers
0x81D6-0x81DD	Artisoft
0x81E6-0x81EF	Polygon
0x81F0-0x81F2	Comsat Labs
0x81F3-0x81F5	SAIC
0x81F6-0x81F8	VG Analytical
0x8203-0x8205	Quantum Software
0x8221-0x8222	Ascom Banking Systems
0x823E-0x8240	Advanced Encryption System
0x827F-0x8282	Athena Programming
0x8263-0x826A	Charles River Data System
0x829A-0x829B	Inst Ind Info Tech
0x829C-0x82AB	Taurus Controls
0x82AC-0x8693	Walker Richer & Quinn
0x8694-0x869D	Idea Courier
0x869E-0x86A1	Computer Network Tech
0x86A3-0x86AC	Gateway Communications
0x86DB	SECTRA
0x86DE	Delta Controls
0x86DF	ATOMIC
0x86E0-0x86EF	Landis & Gyr Powers
0x8700-0x8710	Motorola
0x8A96-0x8A97	Invisible Software
0x9000	Loopback
0x9001	3Com(Bridge) XNS Sys Mgmt

TYPE (HEX VALUES)	DESCRIPTION
0x9002	3Com(Bridge) TCP-IP Sys
0x9003	3Com(Bridge) loop detect
0xFF00	BBN VITAL-LanBridge cache
0xFF00-0xFF0F	ISC Bunker Ramo

C.2   DSAP/SSAP Types

DSAP/SSAP (HEX VALUES)	DESCRIPTION
0x0404	SNA Path Control
0x0505	SNA
0x0606	reserved (DOD IP)
0x0808	SNA
0x0C0C	SNA
0x0E0E	PROWAY-LAN network management and initialization (ISA-S72)
0x4242	MAC Bridge Spanning Tree Protocol (IEEE 802.1D-1993)
0x4E4E	MAP messaging service (EIA RS-511)
0x5E5E	ISI IP
0x8E8E	PROWAY-LAN active station list maintenance (ISA-S72)
0xAAAA	Subnetwork Access Protocol (SNAP)
0xE0E0	Novell Netware
0xF0F0	NetBIOS
0xFEFE	ISO network layer protocol (ISO CLNS DIS 8473)

C.3   OUI Values

A few important OUI values:

OUI (HEX VALUES)	DESCRIPTION
0x000000	RFC 1042 encapsulation
0x0000F8	Bridge-Tunnel encapsulation
0x0020A6	Proxim Inc.
0x00601D	Lucent Technologies
0x00022D	Lucent Technologies (after May 26, 2000)
0x00C0AF	Teklogix Inc.

INDEX

BOLDFACE indicates a menu or sub-menu name; **Boldface** indicates a parameter name.

BOLDFACE indicates a menu or sub-menu name; **Boldface** indicates a parameter name.

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